

0.40 mg/l for  $\text{NH}_4^+-\text{N}$ . From these, it is interpreted that the concentration of ammonium ion is relatively low in spite of high TDS values. According to the WAJ data, on the other hand, the concentration of ammonium ion is high in some cases at Yabis and Deir Alla. Therefore, the contamination at Yabis permits no optimism.

#### (11) Potassium Permanganate ( $\text{KMnO}_4$ ) Consumption Value (PV)

The PV represents the amount of oxidant added to water to oxidize the reductant, i.e. organic substances, in water. But the strength of oxidation condition is rather weak than that of COD, therefore every reductant in water can not be oxidized by  $\text{KMnO}_4$ . Accordingly, the PV shows the level of organic pollution relatively.

According to the data given in Fig. 54, the total mean values are roughly 9 mg/l at Maqaren and roughly 11.0 mg/l at Deir Alla, relatively high both in Yarmuk and the Canal. From the Deir Alla data, it is assumed that the contamination in the section down from Yabis is high, and from the Yarmuk data, the contamination seems to be progressing considerably. This is supported by the evidence of that the differences of the number of total colonies among two stations are large.

### 3) Summary

In the foregoing, we made a statistical analysis of every item concerned in accordance with the measured data of the WAJ and JVA.

From a general point of view about the conditions of the East Ghor Canal, we notice that the water from Inlet maintains its quality down to Yabis, but its quality is deteriorated heavily from Yabis down to Deir Alla. The mean values also indicate likewise.

Such substances as calcium and magnesium deriving from geological features are relatively high in concentration in the section from Inlet to Yabis which becomes higher down from Yabis. This phenomenon is presumed as such that the amount of such substances flowing out of soil increases due to repetitive use of the Canal water as the land from Yabis to Deir Alla is progressively utilized. As to sodium, potassium, chloride ion, sulfate ion and other, the mean values are considerably high and the variation widths are large in the section from Yabis to Deir Alla. These indicate that the human and agricultural activities are active in this section with resultant contamination to a large degree. The water in this section contains ammonium ion beside nitrate ion. From this, it is known that the water quality there is substantially steady but the water includes much human waste water throughout the Canal, especially in the downstream zone of it. The amounts of PV are almost the same in Yarmuk and at Deir Alla. As there is no detailed data about the Canal, it is difficult to grasp the Canal condition in its entirety. However, when a view is given to the degree of contamination in the downstream zone of the Canal, we assume that the amount of PV flowing into Inlet from a underground water system is considerably small. About bicarbonate ion ( $\text{HCO}_3^-$ ) which is very high in general, we presume that this phenomenon is due to the local geological feature with much limestones. This also makes up a factor to increase alkalinity, therefore, suggestive of careful pH treatment at purification plant.

Now, we summarize all the facts and opinions given above. The water collected at Deir Alla is affected by human and agricultural activities, therefore, care must be exercised for coagulation and other treatments with respect to water purification. Moreover, the presence of some hazardous organic matters in the water is undeniable because of the source of contaminants, and also the presence of precursor of trihalomethane is presumed due to the fact.

Table 1. CORRELATION between – Inlet and Adasiyyeh (Whole season)

| DATE T.D.S T.D.S    | DATE     | CI      | CI      | DATE     | S04    | S04    | DATE     | NH4  | NH4  | DATE     | K     | K     |
|---------------------|----------|---------|---------|----------|--------|--------|----------|------|------|----------|-------|-------|
| 1 10 79 501 499     | 1 10 79  | 101.42  | 101.77  | 1 10 79  | 64.84  | 74.45  | 22 5 84  | 0.12 | 0.92 | 1 10 79  | 5.86  | 7.82  |
| 20 1 80 371 482     | 20 1 80  | 67.73   | 65.6    | 20 1 80  | 24.98  | 50.91  | 2 8 84   | 0.77 | 0.98 | 20 1 80  | 3.91  | 3.91  |
| 11 1 81 413 419     | 11 1 81  | 70.21   | 72.69   | 11 1 81  | 50.43  | 54.75  | TOTAL    | 0.89 | 1.90 | 11 1 81  | 5.86  | 5.87  |
| 17 3 81 390 396     | 17 3 81  | 66.66   | 65.6    | 17 3 81  | 45.15  | 38.42  | MEAN     | 0.45 | 0.95 | 17 3 81  | 5.08  | 3.91  |
| 17 5 81 512 528     | 17 5 81  | 103.89  | 96.09   | 17 5 81  | 50.91  | 75.08  | S.D.     | 0.46 | 0.00 | 17 5 81  | 6.64  | 6.26  |
| 6 9 81 534 460      | 6 9 81   | 104.25  | 51.13   | 6 9 81   | 71.56  | 74.45  | (M)      | 0.33 | 0.00 | 6 9 81   | 7.82  | 4.69  |
| 29 12 81 510 531    | 29 12 81 | 92.20   | 92.9    | 29 12 81 | 52.83  | 69.16  | CORR.    |      | 0.00 | 29 12 81 | 5.87  | 5.47  |
| 13 9 82 531 528     | 13 9 82  | 95.74   | 95.74   | 13 9 82  | 80.69  | 77.81  | CON. (A) | (A)  | 0.91 | 13 9 82  | 3.91  | 3.91  |
| 25 3 84 300 313     | 25 3 84  | 45.03   | 48.22   | 25 3 84  | 16.81  | 19.69  | CON. (B) | (B)  | 0.10 | 25 3 84  | 3.91  | 7.82  |
| 13 5 84 492 480     | 13 5 84  | 93.67   | 76.5    | 13 5 84  | 57.63  | 52.83  |          |      |      | 2 8 84   | 3.9   | 3.9   |
| 22 5 84 512 512     | 22 5 84  | 96.25   | 82.6    | 22 5 84  | 71.52  | 29.04  | TOTAL    |      |      | TOTAL    | 52.76 | 53.56 |
| 2 6 84 531 537      | 2 6 84   | 98.35   | 98      | 2 6 84   | 47.04  | 67.2   | MEAN     |      |      | MEAN     | 5.28  | 5.36  |
| 11 7 84 544 537     | 11 7 84  | 28      | 82.95   | 11 7 84  | 70.08  | 70.08  | S.D.     |      |      | S.D.     | 1.37  | 1.57  |
| 2 8 84 569 505      | 2 8 84   | 94.15   | 71.4    | 2 8 84   | 38.4   | 53.76  | (M)      |      |      | (M)      | 1.30  | 1.49  |
| TOTAL 6710 6727     | TOTAL    | 1157.55 | 1101.19 | TOTAL    | 742.87 | 808.43 | CORR.    |      |      | CORR.    |       | 0.22  |
| MEAN 479 481        | MEAN     | 82.68   | 78.66   | MEAN     | 53.06  | 57.75  | CON. (A) | (A)  |      | CON. (A) | (A)   | 4.04  |
| S.D. 79 65          | S.D.     | 23.62   | 17.23   | S.D.     | 18.24  | 18.40  | CON. (B) | (B)  |      | CON. (B) | (B)   | 0.25  |
| (M) 76 63           | (M)      | 22.76   | 16.60   | (M)      | 17.57  | 17.73  |          |      |      |          |       |       |
| CORR. 0.84          | CORR.    |         | 0.42    | CORR.    |        | 0.55   |          |      |      |          |       |       |
| CON. (A) (A) 145.70 | CON. (A) | (A)     | 53.86   | CON. (A) | (A)    | 28.04  |          |      |      |          |       |       |
| CON. (B) (B) 0.70   | CON. (B) | (B)     | 0.30    | CON. (B) | (B)    | 0.56   |          |      |      |          |       |       |

S.D. : Standard Deviation

M : " of Population

Corr. : Correlation factor

Con. (A) : }  
 Con. (B) : } Constant

Table 2. CORRELATION between – Inlet and Adasiyyeh (Dry season)

| DATE T.D.S T.D.S    | DATE     | CI     | CI     | DATE     | S04    | S04    | DATE     | NH4  | NH4  | DATE     | K     | K     |
|---------------------|----------|--------|--------|----------|--------|--------|----------|------|------|----------|-------|-------|
| 6 9 81 534 460      | 6 9 81   | 104.25 | 51.13  | 6 9 81   | 71.56  | 74.45  | 2 8 84   | 0.77 | 0.98 | 6 9 81   | 7.82  | 4.69  |
| 13 9 82 531 528     | 13 9 82  | 95.74  | 95.74  | 13 9 82  | 80.69  | 77.81  | TOTAL    | 0.77 | 0.98 | 13 9 82  | 3.91  | 3.91  |
| 2 6 84 531 537      | 2 6 84   | 98.35  | 98     | 2 6 84   | 47.04  | 67.2   | MEAN     | 0.77 | 0.98 | 2 8 84   | 3.9   | 3.9   |
| 11 7 84 544 537     | 11 7 84  | 28     | 82.95  | 11 7 84  | 70.08  | 70.08  | S.D.     | 0.00 | 0.00 | TOTAL    | 15.63 | 12.50 |
| 2 8 84 569 505      | 2 8 84   | 94.15  | 71.4   | 2 8 84   | 38.4   | 53.76  | (M)      | 0.00 | 0.00 | MEAN     | 5.21  | 4.17  |
| TOTAL 2709 2567     | TOTAL    | 420.49 | 399.22 | TOTAL    | 307.77 | 343.30 | CORR.    |      | 0.00 | S.D.     | 2.26  | 0.46  |
| MEAN 542 513        | MEAN     | 84.10  | 79.84  | MEAN     | 61.55  | 68.66  | CON. (A) | (A)  | 0.98 | (M)      | 1.85  | 0.37  |
| S.D. 16 33          | S.D.     | 31.59  | 19.29  | S.D.     | 17.93  | 9.27   | CON. (B) | (B)  | 0.00 | CORR.    |       | 0.99  |
| (M) 14 29           | (M)      | 28.26  | 17.25  | (M)      | 16.04  | 8.29   |          |      |      | CON. (A) | (A)   | 3.13  |
| CORR. -0.08         | CORR.    |        | -0.16  | CORR.    |        | 0.92   |          |      |      | CON. (B) | (B)   | 0.20  |
| CON. (A) (A) 605.14 | CON. (A) | (A)    | 88.25  | CON. (A) | (A)    | 39.12  |          |      |      |          |       |       |
| CON. (B) (B) -0.17  | CON. (B) | (B)    | -0.10  | CON. (B) | (B)    | 9.48   |          |      |      |          |       |       |

Table 3. CORRELATION between — Inlet and Adasiyyeh (Rain season)

| DATE T.D.S T.D.S    | DATE C1 C1            | DATE S04 S04         | DATE N04 N04      | DATE K K           |
|---------------------|-----------------------|----------------------|-------------------|--------------------|
| 1 10 79 501 499     | 1 10 79 101.42 101.77 | 1 10 79 64.84 74.45  | 22 5 84 0.12 0.92 | 1 10 79 5.86 7.82  |
| 20 1 80 371 482     | 20 1 80 67.73 65.6    | 20 1 80 24.98 59.91  | TOTAL 0.12 0.92   | 20 1 80 3.91 3.91  |
| 17 3 81 390 396     | 17 3 81 66.66 65.6    | 17 3 81 45.15 38.42  | MEAN 0.12 0.92    | 17 3 81 5.08 3.91  |
| 29 12 81 510 531    | 29 12 81 92.20 92.9   | 29 12 81 52.83 69.16 | S.D. 0.00 0.00    | 29 12 81 5.87 5.47 |
| 11 1 81 413 419     | 11 1 81 70.21 72.69   | 11 1 81 50.43 54.75  | (H) 0.00 0.00     | 11 1 81 5.86 5.87  |
| 17 5 81 512 448     | 17 5 81 103.89 54.61  | 17 5 81 50.91 38.42  | CORR. 0.00 0.00   | 17 5 81 6.64 3.91  |
| 13 5 84 492 480     | 13 5 84 93.67 76.5    | 13 5 84 57.63 52.83  | CON. (A) (A) 0.92 | 25 3 84 3.91 7.82  |
| 25 3 84 300 313     | 25 3 84 45.03 48.22   | 25 3 84 16.81 19.69  | CON. (B) (B) 0.00 | TOTAL 37.13 38.71  |
| 22 5 84 512 512     | 22 5 84 96.25 82.6    | 22 5 84 71.52 29.04  |                   | MEAN 5.30 5.53     |
| TOTAL 4001 4080     | TOTAL 737.06 660.49   | TOTAL 435.10 427.67  |                   | S.D. 1.05 1.75     |
| MEAN 445 453        | MEAN 81.90 73.39      | MEAN 48.34 47.52     |                   | (H) 0.97 1.62      |
| S.D. 78 68          | S.D. 20.14 17.28      | S.D. 17.60 17.91     |                   | CORR. -0.12        |
| (H) 74 64           | (H) 18.99 16.29       | (H) 16.59 16.89      |                   | CON. (A) (A) 6.59  |
| CORR. 0.82          | CORR. 0.60            | CORR. 0.39           |                   | CON. (B) (B) -0.20 |
| CON. (A) (A) 137.05 | CON. (A) (A) 30.80    | CON. (A) (A) 28.18   |                   |                    |
| CON. (B) (B) 0.71   | CON. (B) (B) 0.52     | CON. (B) (B) 0.40    |                   |                    |

Table 4. CORRELATION between — Adasiyyeh and Yabis (Whole season)

| DATE T.D.S T.D.S    | DATE C1 C1            | DATE S04 S04          | DATE N04 N04        | DATE K K            |
|---------------------|-----------------------|-----------------------|---------------------|---------------------|
| 2 7 74 544 512      | 2 7 74 95.85 94.07    | 2 7 74 69.12 59.52    | 26 1 75 0.208 0.362 | 2 7 74 5.07 4.29    |
| 26 1 75 496 474     | 26 1 75 88.75 80.58   | 26 1 75 76.8 57.6     | 15 2 75 0.077 0.05  | 26 1 75 4.29 3.9    |
| 15 2 75 300 377     | 15 2 75 44.37 57.15   | 15 2 75 21.6 31.68    | 30 3 75 0.242 0.88  | 15 2 75 4.29 2.73   |
| 30 3 75 409 396     | 30 3 75 66.03 57.15   | 30 3 75 48 43.2       | 27 4 75 0.06 0.18   | 30 3 75 3.51 2.73   |
| 10 4 75 489 486     | 10 4 75 84.13 74.55   | 10 4 75 52.8 59.52    | 22 5 75 1.09 2.14   | 10 4 75 5.07 4.68   |
| 27 4 75 550 528     | 27 4 75 98.69 89.46   | 27 4 75 64.80 70.56   | 4 4 76 0.25 0.49    | 27 4 75 5.46 4.68   |
| 22 5 75 544 506     | 22 5 75 100.11 88.75  | 22 5 75 46.08 56.64   | 27 11 76 0.840 4.8  | 22 5 75 6.24 5.46   |
| 18 11 75 528 531    | 18 11 75 91.24 92.3   | 18 11 75 70.56 59.04  | 22 5 84 0.92 0.35   | 18 11 75 5.46 5.46  |
| 4 4 76 480 442      | 4 4 76 83.33 74.46    | 4 4 76 69.16 62.43    | 2 8 84 0.98 1       | 4 4 76 5.86 5.47    |
| 27 11 76 480 486    | 27 11 76 89 85.45     | 27 11 76 43.22 83.68  | TOTAL 4.67 10.25    | 27 11 76 5.86 5.86  |
| 13 6 77 544 499     | 13 6 77 93.96 79.18   | 13 6 77 44.32 48.03   | MEAN 0.52 1.14      | 13 6 77 7.03 4.69   |
| 8 10 78 498 500     | 8 10 78 92.91 92.55   | 8 10 78 65.32 70.12   | S.D. 0.42 1.51      | 8 10 78 7.43 8.21   |
| 6 12 78 474 458     | 6 12 78 84.39 81.56   | 6 12 78 57.16 47.55   | (H) 0.40 1.42       | 6 12 78 7.43 6.65   |
| 13 2 79 474 480     | 13 2 79 85.1 83.33    | 13 2 79 44.18 36.94   | CORR. 0.56 0.56     | 13 2 79 4.3 4.3     |
| 31 3 79 486 486     | 31 3 79 93.61 92.19   | 31 3 79 57.15 59.07   | CON. (A) (A) 0.14   | 31 3 79 4.05 5.08   |
| 1 5 79 520 528      | 1 5 79 108.5 102.12   | 1 5 79 57.15 66.28    | CON. (B) (B) 1.92   | 1 5 79 5.86 5.08    |
| 3 6 79 540 517      | 3 6 79 103.89 103.45  | 3 6 79 75.88 61.47    |                     | 3 6 79 5.85 5.85    |
| 1 10 79 499 466     | 1 10 79 101.77 90.07  | 1 10 79 74.45 66.76   |                     | 1 10 79 7.82 5.87   |
| 1 12 79 395 259     | 1 12 79 76.24 40.78   | 1 12 79 42.27 19.21   |                     | 1 12 79 4.69 3.52   |
| 20 1 80 482 342     | 20 1 80 65.6 36.88    | 20 1 80 50.91 5.76    |                     | 20 1 80 3.91 3.91   |
| 17 3 81 396 409     | 17 3 81 65.6 62.05    | 17 3 81 38.42 17.29   |                     | 17 3 81 3.91 4.3    |
| 13 9 82 528 633     | 13 9 82 95.74 88.65   | 13 9 82 77.81 153.7   |                     | 13 9 82 3.91 3.91   |
| 23 1 83 384 350     | 23 1 83 70.57 56.38   | 23 1 83 49.47 48.51   |                     | 23 1 83 3.91 3.91   |
| 4 4 83 396 403      | 4 4 83 65.25 61.7     | 4 4 83 44.19 57.64    |                     | 4 4 83 5.47 5.47    |
| 25 3 84 313 320     | 25 3 84 48.22 50.7    | 25 3 84 19.69 38.42   |                     | 25 3 84 7.82 11.73  |
| 22 5 84 512 499     | 22 5 84 82.6 78.05    | 22 5 84 29.04 48      |                     | 2 8 84 3.9 3.9      |
| 2 6 84 537 820      | 2 6 84 98 94.5        | 2 6 84 67.2 71.04     |                     | TOTAL 138.40 131.64 |
| 11 7 84 537 518     | 11 7 84 82.95 96.25   | 11 7 84 70.08 63.84   |                     | MEAN 5.32 5.06      |
| 2 8 84 505 512      | 2 8 84 71.4 89.6      | 2 8 84 53.76 38.4     |                     | S.D. 1.34 1.81      |
| TOTAL 13848 13745   | TOTAL 2427.80 2273.91 | TOTAL 1580.59 1601.90 |                     | (H) 1.32 1.77       |
| MEAN 478 474        | MEAN 83.72 78.41      | MEAN 54.50 55.24      |                     | CORR. 0.77          |
| S.D. 69 102         | S.D. 16.08 18.08      | S.D. 16.01 25.85      |                     | CON. (A) (A) -0.53  |
| (H) 68 100          | (H) 15.80 17.77       | (H) 15.73 25.40       |                     | CON. (B) (B) 1.05   |
| CORR. 0.71          | CORR. 0.81            | CORR. 0.55            |                     |                     |
| CON. (A) (A) -27.90 | CON. (A) (A) 2.22     | CON. (A) (A) 6.74     |                     |                     |
| CON. (B) (B) 1.05   | CON. (B) (B) 0.91     | CON. (B) (B) 0.89     |                     |                     |

Table 5. CORRELATION between — Adasiyyeh and Yabis (Dry season)

| DATE T.D.S T.D.S    | DATE CI CI           | DATE SO4 SO4        | DATE NH4 NH4      | DATE K K          |
|---------------------|----------------------|---------------------|-------------------|-------------------|
| 2 7 74 544 512      | 2 7 74 95.85 94.07   | 2 7 74 69.12 59.52  | 2 8 84 0.98 1     | 2 7 74 5.07 4.29  |
| 13 6 77 544 499     | 13 6 77 93.96 79.18  | 13 6 77 44.32 48.03 | TOTAL 0.98 1.00   | 13 6 77 7.03 4.69 |
| 3 6 79 548 517      | 3 6 79 103.89 103.45 | 3 6 79 75.88 61.47  | MEAN 0.98 1.00    | 3 6 79 5.85 5.85  |
| 13 9 82 528 633     | 13 9 82 95.74 88.65  | 13 9 82 77.81 153.7 | S.D. 0.00 0.00    | 13 9 82 3.91 3.91 |
| 2 6 84 537 820      | 2 6 84 98 94.5       | 2 6 84 67.2 71.04   | (H) 0.00 0.00     | 2 8 84 3.9 3.9    |
| 11 7 84 537 518     | 11 7 84 82.95 96.25  | 11 7 84 70.08 63.84 | CORR. 0.00        | TOTAL 25.76 22.64 |
| 2 8 84 505 512      | 2 8 84 71.4 89.6     | 2 8 84 53.76 38.4   | CON. (A) (A) 1.00 | MEAN 5.15 4.53    |
| TOTAL 3743 4011     | TOTAL 641.79 645.70  | TOTAL 458.17 496.80 | CON. (B) (B) 0.00 | S.D. 1.33 0.81    |
| MEAN 535 573        | MEAN 91.68 92.24     | MEAN 65.45 70.86    |                   | (H) 1.20 0.72     |
| S.D. 15 118         | S.D. 10.92 7.53      | S.D. 12.13 38.09    |                   | CORR. 0.65        |
| (H) 14 109          | (H) 10.11 6.98       | (H) 11.23 35.26     |                   | CON. (A) (A) 2.52 |
| CORR. -0.01         | CORR. 0.27           | CORR. 0.62          |                   | CON. (B) (B) 0.39 |
| CON. (A) (A) 637.20 | CON. (A) (A) 74.82   | CON. (A) (A) -56.11 |                   |                   |
| CON. (B) (B) -0.12  | CON. (B) (B) 0.19    | CON. (B) (B) 1.94   |                   |                   |

Table 6. CORRELATION between — Adasiyyeh and Yabis (Rain season)

| DATE T.D.S T.D.S   | DATE CI CI            | DATE SO4 SO4          | DATE NH4 NH4        | DATE K K            |
|--------------------|-----------------------|-----------------------|---------------------|---------------------|
| 27 4 75 550 528    | 27 4 75 98.69 89.46   | 27 4 75 64.80 70.56   | 27 4 75 0.06 0.18   | 27 4 75 5.46 4.68   |
| 10 4 75 489 486    | 10 4 75 84.13 74.55   | 10 4 75 52.8 59.52    | 22 5 75 1.09 2.14   | 10 4 75 5.07 4.68   |
| 22 5 75 544 506    | 22 5 75 100.11 88.75  | 22 5 75 46.08 56.64   | 30 3 75 0.242 0.88  | 22 5 75 6.24 5.46   |
| 18 11 75 528 531   | 18 11 75 91.24 92.3   | 18 11 75 70.56 59.04  | 15 2 75 0.077 0.05  | 18 11 75 5.46 5.46  |
| 30 3 75 409 396    | 30 3 75 66.03 57.15   | 30 3 75 48 43.2       | 26 1 75 0.208 0.362 | 30 3 75 3.51 2.73   |
| 15 2 75 300 377    | 15 2 75 44.37 57.15   | 15 2 75 21.6 31.68    | 27 11 76 0.840 4.8  | 15 2 75 4.29 2.73   |
| 26 1 75 496 474    | 26 1 75 88.75 80.58   | 26 1 75 76.8 57.6     | 4 4 76 0.25 0.49    | 26 1 75 4.29 3.9    |
| 27 11 76 480 486   | 27 11 76 89 85.45     | 27 11 76 43.22 83.68  | 22 5 84 0.92 0.35   | 27 11 76 5.86 5.86  |
| 4 4 76 480 442     | 4 4 76 83.33 74.46    | 4 4 76 69.16 62.43    | TOTAL 3.69 9.25     | 4 4 76 5.86 5.47    |
| 8 10 78 498 500    | 8 10 78 92.91 92.55   | 8 10 78 65.32 70.12   | MEAN 0.46 1.16      | 8 10 78 7.43 8.21   |
| 6 12 78 474 458    | 6 12 78 84.39 81.56   | 6 12 78 57.16 47.55   | S.D. 0.41 1.61      | 6 12 78 7.43 6.65   |
| 1 10 79 499 466    | 1 10 79 101.77 90.07  | 1 10 79 74.45 66.76   | (H) 0.39 1.51       | 1 10 79 7.82 5.87   |
| 1 5 79 520 528     | 1 5 79 108.5 102.12   | 1 5 79 57.15 66.28    | CORR. 0.62 0.62     | 1 5 79 5.86 5.08    |
| 31 3 79 486 486    | 31 3 79 93.61 92.19   | 31 3 79 57.15 59.07   | CON. (A) (A) 0.07   | 31 3 79 4.05 5.08   |
| 1 12 79 395 259    | 1 12 79 76.24 40.78   | 1 12 79 42.27 19.21   | CON. (B) (B) 2.37   | 1 12 79 4.69 3.52   |
| 13 2 79 474 480    | 13 2 79 85.1 83.33    | 13 2 79 44.18 36.94   |                     | 13 2 79 4.3 4.3     |
| 20 1 80 482 342    | 20 1 80 65.6 36.88    | 20 1 80 50.91 5.76    |                     | 20 1 80 3.91 3.91   |
| 17 3 81 396 409    | 17 3 81 65.6 62.05    | 17 3 81 38.42 17.29   |                     | 17 3 81 3.91 4.3    |
| 4 4 83 396 393     | 4 4 83 65.25 65.6     | 4 4 83 44.19 44.67    |                     | 4 4 83 5.47 3.91    |
| 23 1 83 384 384    | 23 1 83 70.57 66.31   | 23 1 83 49.47 47.55   |                     | 23 1 83 3.91 3.91   |
| 22 5 84 512 499    | 22 5 84 82.6 78.05    | 22 5 84 29.04 48      |                     | 25 3 84 7.82 11.73  |
| 25 3 84 313 320    | 25 3 84 48.22 50.7    | 25 3 84 19.69 38.42   |                     | TOTAL 112.64 107.44 |
| TOTAL 10105 9750   | TOTAL 1786.01 1642.04 | TOTAL 1122.42 1091.97 |                     | MEAN 5.36 5.12      |
| MEAN 459 443       | MEAN 81.18 74.64      | MEAN 51.02 49.64      |                     | S.D. 1.37 1.98      |
| S.D. 70 74         | S.D. 16.81 17.87      | S.D. 15.72 19.18      |                     | (H) 1.34 1.93       |
| (H) 68 72          | (H) 16.42 17.46       | (H) 15.36 18.73       |                     | CORR. 0.80          |
| CORR. 0.79         | CORR. 0.84            | CORR. 0.51            |                     | CON. (A) (A) -1.10  |
| CON. (A) (A) 57.44 | CON. (A) (A) 2.39     | CON. (A) (A) 18.01    |                     | CON. (B) (B) 1.16   |
| CON. (B) (B) 0.84  | CON. (B) (B) 0.89     | CON. (B) (B) 0.62     |                     |                     |

Table 7. CORRELATION between – Adasiyyeh and Yabis (Whole season)

| DATE     | CI/SO4 | CI/SO4 | DATE     | CO3    | CO3    | DATE     | HC03    | HC03    | DATE     | NO3          | NO3   |
|----------|--------|--------|----------|--------|--------|----------|---------|---------|----------|--------------|-------|
| 2 7 74   | 1.39   | 1.58   | 2 7 74   | 7.8    | 6      | 2 7 74   | 234.3   | 229.36  | 2 7 74   | 7.3          | 6.63  |
| 26 1 75  | 1.16   | 1.40   | 26 1 75  | 12.9   | 5.4    | 26 1 75  | 204.35  | 237.29  | 26 1 75  | 9.61         | 9.61  |
| 15 2 75  | 2.05   | 1.80   | 30 3 75  | 10.2   | 11.1   | 15 2 75  | 172.02  | 189.1   | 15 2 75  | 9.52         | 11.6  |
| 30 3 75  | 1.38   | 1.32   | 10 4 75  | 11.1   | 9      | 30 3 75  | 186.66  | 190.32  | 30 3 75  | 5.76         | 7.53  |
| 10 4 75  | 1.59   | 1.25   | 27 4 75  | 11.4   | 17.1   | 10 4 75  | 231.19  | 239.12  | 10 4 75  | 9.57         | 10.63 |
| 27 4 75  | 1.52   | 1.27   | 18 11 75 | 6.3    | 9.6    | 27 4 75  | 231.8   | 207.4   | 27 4 75  | 15.06        | 14.04 |
| 22 5 75  | 2.17   | 1.57   | 4 4 76   | 9.16   | 9.47   | 22 5 75  | 223.87  | 254.98  | 22 5 75  | 11.52        | 12.49 |
| 18 11 75 | 1.29   | 1.56   | 27 11 76 | 9.77   | 14.6   | 18 11 75 | 230.58  | 226.9   | 18 11 75 | 13.46        | 14.53 |
| 4 4 76   | 1.20   | 1.19   | 13 6 77  | 7.63   | 6.41   | 4 4 76   | 201.33  | 202.55  | 4 4 76   | 10.19        | 10.63 |
| 27 11 76 | 2.06   | 1.02   | 8 10 78  | 10.39  | 9.77   | 27 11 76 | 209.87  | 198.89  | 27 11 76 | 12.05        | 11.6  |
| 13 6 77  | 2.12   | 1.65   | 6 12 78  | 10.39  | 11     | 13 6 77  | 247.09  | 249.53  | 13 6 77  | 23.29        | 11.83 |
| 8 10 78  | 1.42   | 1.32   | 13 2 79  | 15.27  | 12.83  | 8 10 78  | 233.06  | 203.77  | 8 10 78  | 27.9         | 29.69 |
| 6 12 78  | 1.48   | 1.72   | 31 3 79  | 13.44  | 15.88  | 6 12 78  | 200.11  | 193.4   | 6 12 78  | 12.09        | 11.29 |
| 13 2 79  | 1.93   | 2.26   | 1 5 79   | 7.33   | 8.55   | 13 2 79  | 215.36  | 224.51  | 13 2 79  | 11.51        | 11.95 |
| 31 3 79  | 1.64   | 1.56   | 3 6 79   | 12.22  | 10.99  | 31 3 79  | 219.63  | 111.67  | 31 3 79  | 11.51        | 11.07 |
| 1 5 79   | 1.90   | 1.54   | 1 10 79  | 13.44  | 15.89  | 1 5 79   | 217.19  | 241.59  | 1 5 79   | 16.39        | 15    |
| 3 6 79   | 1.37   | 1.68   | 17 3 81  | 12.22  | 10.99  | 3 6 79   | 231.83  | 222.07  | 3 6 79   | 11.96        | 16.6  |
| 1 10 79  | 1.37   | 1.35   | 23 1 83  | 3.67   | 5.8    | 1 10 79  | 222.08  | 206.21  | 1 10 79  | 15.51        | 13.7  |
| 1 12 79  | 1.80   | 2.12   | 4 4 83   | 7.64   | 3.67   | 1 12 79  | 189.13  | 135.44  | 1 12 79  | 22.59        | 17.2  |
| 20 1 80  | 1.29   | 6.40   | 22 5 84  | 22.8   | 11.04  | 20 1 80  | 170.83  | 222.08  | 20 1 80  | 25.69        | 33.8  |
| 17 3 81  | 1.71   | 3.59   | 2 6 84   | 9      | 3.6    | 17 3 81  | 178.15  | 200.72  | 17 3 81  | 19.93        | 23.9  |
| 13 9 82  | 1.23   | 0.58   | 11 7 84  | 9.9    | 16.5   | 13 9 82  | 250.75  | 272.1   | 13 9 82  | 9.61         | 8.8   |
| 23 1 83  | 1.43   | 1.16   | 2 8 84   | 4.2    | 2.4    | 23 1 83  | 197.06  | 199.5   | 23 1 83  | 12.98        | 13.1  |
| 4 4 83   | 1.48   | 1.07   | TOTAL    | 238.17 | 227.59 | 4 4 83   | 180.59  | 198.89  | 4 4 83   | 10.54        | 10.9  |
| 25 3 84  | 2.45   | 1.32   | MEAN     | 10.36  | 9.90   | 25 3 84  | 164.72  | 142.76  | 25 3 84  | 12.85        | 7.7   |
| 22 5 84  | 2.84   | 1.63   | S.D.     | 3.97   | 4.30   | 22 5 84  | 212.89  | 230.58  | 22 5 84  | 10           | 11    |
| 2 6 84   | 1.46   | 1.33   | (M)      | 3.88   | 4.20   | 2 6 84   | 251.94  | 222.65  | 2 6 84   | 14.4         | 10.8  |
| 11 7 84  | 1.18   | 1.51   | CORR.    | 0.49   | 0.49   | 11 7 84  | 197.77  | 203.13  | 11 7 84  | 9.17         | 9.2   |
| 2 8 84   | 1.33   | 2.33   | CON. (A) | (A)    | 4.41   | 2 8 84   | 247.6   | 264.74  | 2 8 84   | 8.2          | 8.3   |
| TOTAL    | 47.24  | 50.08  | CON. (B) | (B)    | 0.53   | TOTAL    | 6153.75 | 6121.25 | TOTAL    | 390.16385.12 |       |
| MEAN     | 1.63   | 1.73   |          |        |        | MEAN     | 212.20  | 211.08  | MEAN     | 13.45        | 13.28 |
| S.D.     | 0.41   | 1.04   |          |        |        | S.D.     | 25.32   | 35.95   | S.D.     | 5.51         | 6.18  |
| (M)      | 0.40   | 1.02   |          |        |        | (M)      | 24.87   | 35.33   | (M)      | 5.41         | 6.07  |
| CORR.    |        | -0.05  |          |        |        | CORR.    |         | 0.56    | CORR.    |              | 0.83  |
| CON. (A) | (A)    | 1.94   |          |        |        | CON. (A) | (A)     | 41.32   | CON. (A) | (A)          | 0.64  |
| CON. (B) | (B)    | -0.13  |          |        |        | CON. (B) | (B)     | 0.80    | CON. (B) | (B)          | 0.94  |

Table 8. CORRELATION between – Adasiyyeh and Yabis (Dry season)

| DATE     | CI/SO4 | CI/SO4 | DATE     | CO3   | CO3   | DATE     | HC03    | HC03    | DATE     | NO3   | NO3   |
|----------|--------|--------|----------|-------|-------|----------|---------|---------|----------|-------|-------|
| 2 7 74   | 1.39   | 1.58   | 2 7 74   | 7.8   | 6     | 2 7 74   | 234.3   | 229.36  | 2 7 74   | 7.3   | 6.63  |
| 13 6 77  | 2.12   | 1.65   | 13 6 77  | 7.63  | 6.41  | 13 6 77  | 247.09  | 249.53  | 13 6 77  | 23.29 | 11.83 |
| 3 6 79   | 1.37   | 1.68   | 3 6 79   | 12.22 | 10.99 | 3 6 79   | 231.83  | 222.07  | 3 6 79   | 11.96 | 16.6  |
| 13 9 82  | 1.23   | 0.58   | 2 6 84   | 9     | 3.6   | 13 9 82  | 250.75  | 272.1   | 13 9 82  | 9.61  | 8.8   |
| 2 6 84   | 1.46   | 1.33   | 11 7 84  | 9.9   | 16.5  | 2 6 84   | 251.94  | 222.65  | 2 6 84   | 14.4  | 10.8  |
| 11 7 84  | 1.18   | 1.51   | 2 8 84   | 4.2   | 2.4   | 11 7 84  | 197.77  | 203.13  | 11 7 84  | 9.17  | 9.2   |
| 2 8 84   | 1.33   | 2.33   | TOTAL    | 50.75 | 45.90 | 2 8 84   | 247.6   | 264.74  | 2 8 84   | 8.2   | 8.3   |
| TOTAL    | 10.08  | 10.66  | MEAN     | 8.46  | 7.65  | TOTAL    | 1661.28 | 1663.58 | TOTAL    | 83.93 | 72.16 |
| MEAN     | 1.44   | 1.52   | S.D.     | 2.68  | 5.25  | MEAN     | 237.33  | 237.65  | MEAN     | 11.99 | 10.31 |
| S.D.     | 0.32   | 0.52   | (M)      | 2.44  | 4.79  | S.D.     | 19.14   | 25.13   | S.D.     | 5.53  | 3.24  |
| (M)      | 0.28   | 0.48   | CORR.    | 0.68  | 0.68  | (M)      | 17.72   | 23.27   | (M)      | 5.12  | 3.00  |
| CORR.    |        | 0.18   | CON. (A) | (A)   | -3.60 | CORR.    |         | 0.73    | CORR.    |       | 0.46  |
| CON. (A) | (A)    | 1.04   | CON. (B) | (B)   | 1.33  | CON. (A) | (A)     | 9.81    | CON. (A) | (A)   | 7.07  |
| CON. (B) | (B)    | 0.33   |          |       |       | CON. (B) | (B)     | 0.96    | CON. (B) | (B)   | 0.27  |

Table 9. CORRELATION between – Adasiyyeh and Yabis (Rain season)

| DATE     | CI/SO4 | CI/SO4 | DATE     | CO3    | CO3    | DATE     | HC03    | HC03    | DATE     | NO3    | NO3    |
|----------|--------|--------|----------|--------|--------|----------|---------|---------|----------|--------|--------|
| 27 4 75  | 1.52   | 1.27   | 27 4 75  | 11.4   | 17.1   | 27 4 75  | 231.8   | 207.4   | 27 4 75  | 15.06  | 14.04  |
| 10 4 75  | 1.59   | 1.25   | 10 4 75  | 11.1   | 9      | 10 4 75  | 231.19  | 239.12  | 10 4 75  | 9.57   | 10.63  |
| 22 5 75  | 2.17   | 1.57   | 18 11 75 | 6.3    | 9.6    | 22 5 75  | 223.87  | 254.98  | 22 5 75  | 11.52  | 12.49  |
| 18 11 75 | 1.29   | 1.56   | 30 3 75  | 10.2   | 11.1   | 18 11 75 | 230.58  | 226.9   | 18 11 75 | 13.46  | 14.53  |
| 30 3 75  | 1.38   | 1.32   | 26 1 75  | 12.9   | 5.4    | 30 3 75  | 186.66  | 190.32  | 30 3 75  | 5.76   | 7.53   |
| 15 2 75  | 2.05   | 1.80   | 27 11 76 | 9.77   | 14.6   | 15 2 75  | 172.02  | 189.1   | 15 2 75  | 9.52   | 11.6   |
| 26 1 75  | 1.16   | 1.40   | 4 4 76   | 9.16   | 9.47   | 26 1 75  | 204.35  | 237.29  | 26 1 75  | 9.61   | 9.61   |
| 27 11 76 | 2.06   | 1.02   | 8 10 78  | 10.39  | 9.77   | 27 11 76 | 209.87  | 198.89  | 27 11 76 | 12.05  | 11.6   |
| 4 4 76   | 1.20   | 1.19   | 6 12 78  | 10.39  | 11     | 4 4 76   | 201.33  | 202.55  | 4 4 76   | 10.19  | 10.63  |
| 8 10 78  | 1.42   | 1.32   | 1 10 79  | 13.44  | 15.89  | 8 10 78  | 233.06  | 203.77  | 8 10 78  | 27.9   | 29.69  |
| 6 12 78  | 1.48   | 1.72   | 1 5 79   | 7.33   | 8.55   | 6 12 78  | 200.11  | 193.4   | 6 12 78  | 12.09  | 11.29  |
| 1 10 79  | 1.37   | 1.35   | 31 3 79  | 13.44  | 15.88  | 1 10 79  | 222.08  | 206.21  | 1 10 79  | 15.51  | 13.7   |
| 1 5 79   | 1.90   | 1.54   | 13 2 79  | 15.27  | 12.83  | 1 5 79   | 217.19  | 241.59  | 1 5 79   | 16.39  | 15     |
| 31 3 79  | 1.64   | 1.56   | 17 3 81  | 12.22  | 10.99  | 31 3 79  | 219.63  | 111.67  | 31 3 79  | 11.51  | 11.07  |
| 1 12 79  | 1.80   | 2.12   | 23 1 83  | 3.67   | 5.19   | 1 12 79  | 189.13  | 135.44  | 1 12 79  | 22.59  | 17.2   |
| 13 2 79  | 1.93   | 2.26   | 22 5 84  | 22.8   | 11.04  | 13 2 79  | 215.36  | 224.51  | 13 2 79  | 11.51  | 11.95  |
| 20 1 80  | 1.29   | 6.40   | TOTAL    | 179.78 | 177.41 | 20 1 80  | 170.83  | 222.08  | 20 1 80  | 25.69  | 33.8   |
| 17 3 81  | 1.71   | 3.59   | MEAN     | 11.24  | 11.09  | 17 3 81  | 178.15  | 200.72  | 17 3 81  | 19.93  | 23.9   |
| 4 4 83   | 1.48   | 1.47   | S.D.     | 4.24   | 3.48   | 4 4 83   | 180.59  | 204.99  | 4 4 83   | 10.54  | 10     |
| 23 1 83  | 1.43   | 1.39   | (H)      | 4.10   | 3.37   | 23 1 83  | 197.06  | 189.74  | 23 1 83  | 12.98  | 12.1   |
| 22 5 84  | 2.84   | 1.63   | CORR.    |        | 0.36   | 22 5 84  | 212.89  | 230.58  | 22 5 84  | 10     | 11     |
| 25 3 84  | 2.45   | 1.32   | CON. (A) | (A)    | 7.72   | 25 3 84  | 164.72  | 142.76  | 25 3 84  | 12.85  | 7.7    |
| TOTAL    | 37.16  | 40.05  | CON. (B) | (B)    | 0.30   | TOTAL    | 4492.47 | 4454.01 | TOTAL    | 306.23 | 311.06 |
| MEAN     | 1.69   | 1.82   |          |        |        | MEAN     | 204.20  | 202.46  | MEAN     | 13.92  | 14.14  |
| S.D.     | 0.42   | 1.15   |          |        |        | S.D.     | 21.73   | 35.21   | S.D.     | 5.55   | 6.67   |
| (H)      | 0.41   | 1.13   |          |        |        | (H)      | 21.23   | 34.40   | (H)      | 5.42   | 6.51   |
| CORR.    |        | -0.12  |          |        |        | CORR.    |         | 0.37    | CORR.    |        | 0.91   |
| CON. (A) | (A)    | 2.39   |          |        |        | CON. (A) | (A)     | 79.94   | CON. (A) | (A)    | -1.17  |
| CON. (B) | (B)    | -0.34  |          |        |        | CON. (B) | (B)     | 0.60    | CON. (B) | (B)    | 1.10   |

Table 10. CORRELATION between – Adasiyyeh and Yabis (Whole season)

| DATE     | Ca      | Ca      | DATE     | Mg     | Mg     | DATE     | Na      | Na      | DATE     | Ca+Mg/Na+K | Ca+Mg/Na+K |
|----------|---------|---------|----------|--------|--------|----------|---------|---------|----------|------------|------------|
| 2 7 74   | 52.80   | 53.8    | 2 7 74   | 29.54  | 30.66  | 2 7 74   | 74.75   | 62.1    | 2 7 74   | 1.03       | 1.27       |
| 26 1 75  | 48.00   | 47.2    | 26 1 75  | 23.59  | 27.23  | 26 1 75  | 79.35   | 63.25   | 26 1 75  | 0.86       | 1.11       |
| 15 2 75  | 36.40   | 38.4    | 15 2 75  | 15.70  | 21.03  | 15 2 75  | 35.65   | 51.75   | 15 2 75  | 1.30       | 1.09       |
| 30 3 75  | 35.60   | 40      | 30 3 75  | 22.13  | 21.88  | 30 3 75  | 60.95   | 51.75   | 30 3 75  | 0.90       | 1.14       |
| 10 4 75  | 21.70   | 52      | 10 4 75  | 50.00  | 27.23  | 10 4 75  | 63.25   | 63.25   | 10 4 75  | 1.05       | 1.17       |
| 27 4 75  | 50.60   | 52.4    | 27 4 75  | 27.60  | 26.99  | 27 4 75  | 81.65   | 51.75   | 27 4 75  | 0.90       | 1.41       |
| 22 5 75  | 51.20   | 52      | 22 5 75  | 27.23  | 27.22  | 22 5 75  | 80.5    | 70.15   | 22 5 75  | 0.90       | 1.05       |
| 18 11 75 | 48.80   | 51.6    | 18 11 75 | 25.90  | 24.7   | 18 11 75 | 82.8    | 82.8    | 18 11 75 | 0.85       | 0.86       |
| 4 4 76   | 49.29   | 43.20   | 4 4 76   | 21.64  | 22.37  | 4 4 76   | 68.97   | 65.52   | 4 4 76   | 0.95       | 0.92       |
| 27 11 76 | 46.09   | 46.89   | 27 11 76 | 22.37  | 24.56  | 27 11 76 | 71.27   | 70.11   | 27 11 76 | 0.89       | 0.94       |
| 13 6 77  | 50.30   | 48.3    | 13 6 77  | 28.90  | 30.52  | 13 6 77  | 78.16   | 64.37   | 13 6 77  | 0.93       | 1.14       |
| 8 10 78  | 46.69   | 46.49   | 8 10 78  | 25.66  | 25.77  | 8 10 78  | 87.36   | 79.31   | 8 10 78  | 0.76       | 0.83       |
| 6 12 78  | 43.09   | 42.28   | 6 12 78  | 20.79  | 18.97  | 6 12 78  | 78.17   | 72.42   | 6 12 78  | 0.75       | 0.77       |
| 13 2 79  | 42.28   | 45.09   | 13 2 79  | 22.98  | 21.23  | 13 2 79  | 80.46   | 75.86   | 13 2 79  | 0.77       | 0.83       |
| 31 3 79  | 47.29   | 47.29   | 31 3 79  | 28.08  | 28.08  | 31 3 79  | 72.4    | 72.4    | 31 3 79  | 0.99       | 0.97       |
| 1 5 79   | 51.3    | 53.5    | 1 5 79   | 25.17  | 29.91  | 1 5 79   | 82.76   | 78.16   | 1 5 79   | 0.86       | 1.00       |
| 3 6 79   | 54.1    | 51.3    | 3 6 79   | 28.21  | 27.23  | 3 6 79   | 89.66   | 80.46   | 3 6 79   | 0.86       | 0.91       |
| 1 10 79  | 48.7    | 43.09   | 1 10 79  | 26.14  | 30.04  | 1 10 79  | 89.66   | 74.72   | 1 10 79  | 0.77       | 0.91       |
| 1 12 79  | 43.49   | 36.07   | 1 12 79  | 18.48  | 0.24   | 1 12 79  | 66.67   | 33.34   | 1 12 79  | 0.87       | 0.99       |
| 20 1 80  | 36.67   | 51.91   | 20 1 80  | 21.4   | 21.77  | 20 1 80  | 58.62   | 20.69   | 20 1 80  | 0.93       | 3.00       |
| 17 3 81  | 43.09   | 48.69   | 17 3 81  | 17.51  | 18.96  | 17 3 81  | 57.01   | 46.44   | 17 3 81  | 0.99       | 1.33       |
| 13 9 82  | 53.51   | 56.11   | 13 9 82  | 28.09  | 53.5   | 13 9 82  | 80.47   | 71.27   | 13 9 82  | 0.97       | 1.46       |
| 23 1 83  | 43.89   | 48.9    | 23 1 83  | 18.97  | 19.7   | 23 1 83  | 59.77   | 45.7    | 23 1 83  | 0.99       | 1.38       |
| 4 4 83   | 43.69   | 46.49   | 4 4 83   | 19.94  | 20.67  | 4 4 83   | 55.18   | 55.18   | 4 4 83   | 1.05       | 1.11       |
| 25 3 84  | 33.06   | 32.86   | 25 3 84  | 13.98  | 13.62  | 25 3 84  | 41.38   | 45.98   | 25 3 84  | 0.96       | 0.81       |
| 22 5 84  | 23.8    | 50.06   | 22 5 84  | 25.32  | 25.92  | 22 5 84  | 73.6    | 66.07   | 22 5 84  | 0.96       | 0.72       |
| 2 6 84   | 52.8    | 53      | 2 6 84   | 23.28  | 23.4   | 2 6 84   | 85.1    | 80.5    | 11 7 84  | 0.85       | 0.98       |
| 11 7 84  | 50.4    | 47.6    | 11 7 84  | 26.52  | 28.44  | 11 7 84  | 78.22   | 73.6    | 2 8 84   | 0.86       | 1.84       |
| 2 8 84   | 48.6    | 55      | 2 8 84   | 20.16  | 83.64  | 2 8 84   | 75.9    | 71.3    | TOTAL    | 25.75      | 31.94      |
| TOTAL    | 1297.23 | 1381.60 | TOTAL    | 705.28 | 775.48 | TOTAL    | 2089.69 | 1840.20 | MEAN     | 0.92       | 1.14       |
| MEAN     | 44.73   | 47.64   | MEAN     | 24.32  | 26.74  | MEAN     | 72.06   | 63.46   | S.D.     | 0.10       | 0.44       |
| S.D.     | 8.25    | 5.73    | S.D.     | 6.41   | 13.69  | S.D.     | 13.49   | 15.02   | (H)      | 0.10       | 0.44       |
| (H)      | 8.11    | 5.63    | (H)      | 6.30   | 13.45  | (H)      | 13.26   | 14.76   | CORR.    |            | 0.25       |
| CORR.    |         | 0.35    | CORR.    |        | 0.19   | CORR.    |         | 0.71    | CON. (A) | (A)        | 0.41       |
| CON. (A) | (A)     | 36.90   | CON. (A) | (A)    | 16.77  | CON. (A) | (A)     | 6.53    | CON. (B) | (B)        | 0.79       |
| CON. (B) | (B)     | 0.24    | CON. (B) | (B)    | 0.41   | CON. (B) | (B)     | 0.79    |          |            |            |

Table 11. CORRELATION between — Adasiyyeh and Yabis (Dry season)

| DATE     | Ca     | Ca     | DATE     | Mg     | Mg     | DATE     | Na     | Na     | DATE     | Ca/Mg/Na+K | Ca/Mg/Na+K |
|----------|--------|--------|----------|--------|--------|----------|--------|--------|----------|------------|------------|
| 2 7 74   | 52.80  | 53.8   | 2 7 74   | 29.54  | 30.66  | 2 7 74   | 74.75  | 62.1   | 2 7 74   | 1.03       | 1.27       |
| 13 6 77  | 50.30  | 48.3   | 13 6 77  | 28.90  | 30.52  | 13 6 77  | 78.16  | 64.37  | 13 6 77  | 0.93       | 1.14       |
| 3 6 79   | 54.1   | 51.3   | 3 6 79   | 28.21  | 27.23  | 3 6 79   | 89.66  | 80.46  | 3 6 79   | 0.86       | 0.91       |
| 13 9 82  | 53.51  | 56.11  | 13 9 82  | 28.09  | 53.5   | 13 9 82  | 80.47  | 71.27  | 13 9 82  | 0.97       | 1.46       |
| 2 6 84   | 52.8   | 53     | 2 6 84   | 23.28  | 23.4   | 2 6 84   | 85.1   | 80.5   | 11 7 84  | 0.85       | 0.98       |
| 11 7 84  | 50.4   | 47.6   | 11 7 84  | 26.52  | 28.44  | 11 7 84  | 78.22  | 73.6   | 2 8 84   | 0.86       | 1.84       |
| 2 8 84   | 48.6   | 55     | 2 8 84   | 20.16  | 83.64  | 2 8 84   | 75.9   | 71.3   | TOTAL    | 5.50       | 7.60       |
| TOTAL    | 362.51 | 365.11 | TOTAL    | 184.70 | 277.39 | TOTAL    | 562.26 | 503.60 | MEAN     | 0.92       | 1.27       |
| MEAN     | 51.79  | 52.16  | MEAN     | 26.39  | 39.63  | MEAN     | 80.32  | 71.94  | S.D.     | 0.00       | 0.35       |
| S.D.     | 2.03   | 3.25   | S.D.     | 3.44   | 21.74  | S.D.     | 5.32   | 7.11   | (H)      | 0.00       | 0.32       |
| (H)      | 1.88   | 3.01   | (H)      | 3.18   | 20.12  | (H)      | 4.92   | 6.59   | CORR.    |            | 0.00       |
| CORR.    |        | 0.26   | CORR.    |        | -0.61  | CORR.    |        | 0.84   | CON. (A) | (A)        | -0.57      |
| CON. (A) | (A)    | 30.41  | CON. (A) | (A)    | 142.02 | CON. (A) | (A)    | -18.02 | CON. (B) | (B)        | 2.00       |
| CON. (B) | (B)    | 0.42   | CON. (B) | (B)    | -3.88  | CON. (B) | (B)    | 1.12   |          |            |            |

Table 12. CORRELATION between — Adasiyyeh and Yabis (Rain season)

| DATE     | Ca     | Ca      | DATE     | Mg     | Mg     | DATE     | Na      | Na      | DATE     | Ca/Mg/Na+K | Ca/Mg/Na+K |
|----------|--------|---------|----------|--------|--------|----------|---------|---------|----------|------------|------------|
| 27 4 75  | 50.60  | 52.4    | 27 4 75  | 27.60  | 26.99  | 27 4 75  | 81.65   | 51.75   | 27 4 75  | 0.90       | 1.41       |
| 10 4 75  | 21.70  | 52      | 10 4 75  | 50.80  | 27.23  | 10 4 75  | 63.25   | 63.25   | 10 4 75  | 1.05       | 1.17       |
| 22 5 75  | 51.20  | 52      | 22 5 75  | 27.23  | 27.22  | 22 5 75  | 80.5    | 70.15   | 22 5 75  | 0.90       | 1.05       |
| 18 11 75 | 48.80  | 51.6    | 18 11 75 | 25.90  | 24.7   | 18 11 75 | 82.8    | 82.8    | 18 11 75 | 0.85       | 0.86       |
| 30 3 75  | 35.60  | 40      | 30 3 75  | 22.13  | 21.88  | 30 3 75  | 60.95   | 51.75   | 30 3 75  | 0.90       | 1.14       |
| 15 2 75  | 36.40  | 38.4    | 15 2 75  | 15.70  | 21.03  | 15 2 75  | 35.65   | 51.75   | 15 2 75  | 1.30       | 1.09       |
| 26 1 75  | 48.00  | 47.2    | 26 1 75  | 23.59  | 27.23  | 26 1 75  | 79.35   | 63.25   | 26 1 75  | 0.86       | 1.11       |
| 27 11 76 | 46.09  | 46.89   | 27 11 76 | 22.37  | 24.56  | 27 11 76 | 71.27   | 70.11   | 27 11 76 | 0.89       | 0.94       |
| 4 4 76   | 49.29  | 43.28   | 4 4 76   | 21.64  | 22.37  | 4 4 76   | 68.97   | 65.52   | 4 4 76   | 0.95       | 0.92       |
| 8 10 78  | 46.69  | 46.49   | 8 10 78  | 25.66  | 25.77  | 8 10 78  | 87.36   | 79.31   | 8 10 78  | 0.76       | 0.83       |
| 6 12 78  | 43.09  | 42.28   | 6 12 78  | 20.79  | 18.97  | 6 12 78  | 78.17   | 72.42   | 6 12 78  | 0.75       | 0.77       |
| 1 10 79  | 48.7   | 43.09   | 1 10 79  | 26.14  | 30.04  | 1 10 79  | 89.66   | 74.72   | 1 10 79  | 0.77       | 0.91       |
| 1 5 79   | 51.3   | 53.5    | 1 5 79   | 25.17  | 29.91  | 1 5 79   | 82.76   | 78.16   | 1 5 79   | 0.86       | 1.00       |
| 31 3 79  | 47.29  | 47.29   | 31 3 79  | 28.08  | 28.08  | 31 3 79  | 72.4    | 72.4    | 31 3 79  | 0.99       | 0.97       |
| 1 12 79  | 43.49  | 36.07   | 1 12 79  | 18.48  | 0.24   | 1 12 79  | 66.67   | 33.34   | 1 12 79  | 0.87       | 0.99       |
| 13 2 79  | 42.28  | 45.09   | 13 2 79  | 22.98  | 21.23  | 13 2 79  | 80.46   | 75.86   | 13 2 79  | 0.77       | 0.83       |
| 20 1 80  | 36.67  | 51.91   | 20 1 80  | 21.4   | 21.77  | 20 1 80  | 58.62   | 20.69   | 20 1 80  | 0.93       | 3.00       |
| 17 3 81  | 43.09  | 48.69   | 17 3 81  | 17.51  | 18.96  | 17 3 81  | 57.01   | 46.44   | 17 3 81  | 0.99       | 1.33       |
| 4 4 83   | 43.69  | 45.69   | 4 4 83   | 19.94  | 19.94  | 4 4 83   | 55.18   | 52.88   | 4 4 83   | 1.05       | 1.16       |
| 23 1 83  | 43.89  | 47.9    | 23 1 83  | 18.97  | 16.54  | 23 1 83  | 59.77   | 59.77   | 23 1 83  | 0.99       | 1.01       |
| 22 5 84  | 23.8   | 50.06   | 22 5 84  | 25.32  | 25.92  | 22 5 84  | 73.6    | 66.07   | 22 5 84  | 0.96       | 0.72       |
| 25 3 84  | 33.06  | 32.06   | 25 3 84  | 13.98  | 13.62  | 25 3 84  | 41.38   | 45.98   | 25 3 84  | 0.96       | 0.81       |
| TOTAL    | 934.72 | 1014.69 | TOTAL    | 520.58 | 494.20 | TOTAL    | 1527.43 | 1348.37 | TOTAL    | 20.25      | 24.02      |
| MEAN     | 42.49  | 46.12   | MEAN     | 23.66  | 22.46  | MEAN     | 69.43   | 61.29   | MEAN     | 0.92       | 1.09       |
| S.D.     | 8.23   | 5.62    | S.D.     | 7.04   | 6.57   | S.D.     | 14.31   | 15.66   | S.D.     | 0.10       | 0.46       |
| (H)      | 8.04   | 5.49    | (H)      | 6.88   | 6.42   | (H)      | 13.98   | 15.30   | (H)      | 0.10       | 0.45       |
| CORR.    |        | 0.16    | CORR.    |        | 0.53   | CORR.    |         | 0.66    | CORR.    |            | 0.20       |
| CON. (A) | (A)    | 41.45   | CON. (A) | (A)    | 10.87  | CON. (A) | (A)     | 11.30   | CON. (A) | (A)        | 0.36       |
| CON. (B) | (B)    | 0.11    | CON. (B) | (B)    | 0.49   | CON. (B) | (B)     | 0.72    | CON. (B) | (B)        | 0.79       |

Table 13. CORRELATION between -- Yabis and Dier Alla (Whole season)

| DATE T.D.S T.D.S    | DATE     | CI      | CI      | DATE     | SO4     | SO4    | DATE     | NH4   | NH4   | DATE     | K      | K      |
|---------------------|----------|---------|---------|----------|---------|--------|----------|-------|-------|----------|--------|--------|
| 2 7 74 512 704      | 2 7 74   | 94.07   | 168.62  | 2 7 74   | 59.52   | 111.84 | 26 1 75  | 0.362 | 0.208 | 2 7 74   | 4.29   | 8.19   |
| 26 1 75 474 576     | 26 1 75  | 80.58   | 114.31  | 26 1 75  | 57.6    | 81.6   | 15 2 75  | 0.05  | 0.05  | 26 1 75  | 3.9    | 5.07   |
| 15 2 75 377 704     | 15 2 75  | 57.15   | 197.38  | 15 2 75  | 31.68   | 55.68  | 30 3 75  | 0.88  | 0.71  | 15 2 75  | 2.73   | 7.8    |
| 30 3 75 396 569     | 30 3 75  | 57.15   | 115.37  | 30 3 75  | 43.2    | 86.4   | 27 4 75  | 0.18  | 0.21  | 30 3 75  | 2.73   | 6.24   |
| 10 4 75 406 717     | 10 4 75  | 74.55   | 153.36  | 10 4 75  | 59.52   | 117.12 | 22 5 75  | 2.14  | 7.05  | 10 4 75  | 4.68   | 7.8    |
| 27 4 75 528 659     | 27 4 75  | 89.46   | 132.41  | 27 4 75  | 70.56   | 108.48 | 16 2 76  | 0.05  | 0.1   | 27 4 75  | 4.68   | 6.24   |
| 22 5 75 506 806     | 22 5 75  | 88.75   | 198.8   | 22 5 75  | 56.64   | 129.6  | 4 4 76   | 0.49  | 0.40  | 22 5 75  | 5.46   | 11.7   |
| 18 11 75 531 659    | 18 11 75 | 92.3    | 137.03  | 18 11 75 | 59.04   | 126.70 | 27 11 76 | 4.8   | 0.48  | 18 11 75 | 5.46   | 8.2    |
| 16 2 76 314 486     | 16 2 76  | 48.58   | 91.84   | 16 2 76  | 42.27   | 75.88  | 2 8 84   | 1     | 1     | 16 2 76  | 3.91   | 6.64   |
| 4 4 76 442 544      | 4 4 76   | 74.46   | 109.92  | 4 4 76   | 62.43   | 81.65  | TOTAL    | 9.95  | 10.21 | 4 4 76   | 5.47   | 7.82   |
| 27 11 76 486 592    | 27 11 76 | 85.45   | 117.73  | 27 11 76 | 83.68   | 107.59 | MEAN     | 1.11  | 1.13  | 27 11 76 | 5.86   | 7.03   |
| 23 9 78 506 1280    | 23 9 78  | 95.03   | 326.23  | 23 9 78  | 55.71   | 288.18 | S.D.     | 1.53  | 2.24  | 23 9 78  | 5.08   | 25.02  |
| 8 10 78 500 1059    | 8 10 78  | 92.55   | 274.46  | 8 10 78  | 70.12   | 215.17 | (H)      | 1.45  | 2.11  | 8 10 78  | 8.21   | 24.63  |
| 13 2 79 480 595     | 13 2 79  | 83.33   | 125.88  | 13 2 79  | 36.94   | 67.24  | CORR.    |       | 0.29  | 13 2 79  | 4.3    | 7.42   |
| 31 3 79 486 582     | 31 3 79  | 92.19   | 127.65  | 31 3 79  | 59.07   | 98.46  | CON. (A) | (A)   | 0.65  | 31 3 79  | 5.08   | 8.21   |
| 1 5 79 528 1516     | 1 5 79   | 102.12  | 469.84  | 1 5 79   | 66.28   | 425.52 | CON. (B) | (B)   | 0.43  | 1 5 79   | 5.08   | 35.58  |
| 1 10 79 466 1723    | 1 10 79  | 90.07   | 511.33  | 1 10 79  | 66.76   | 417.38 |          |       |       | 1 10 79  | 5.87   | 38.71  |
| 1 12 79 259 425     | 1 12 79  | 40.78   | 88.65   | 1 12 79  | 19.21   | 81.65  |          |       |       | 1 12 79  | 3.52   | 10.16  |
| 20 1 80 342 319     | 20 1 80  | 36.88   | 51.06   | 20 1 80  | 5.76    | 21.13  |          |       |       | 20 1 80  | 3.91   | 3.91   |
| 17 3 81 409 409     | 17 3 81  | 62.05   | 62.05   | 17 3 81  | 17.29   | 24.49  |          |       |       | 17 3 81  | 4.3    | 3.52   |
| 13 9 82 633 588     | 13 9 82  | 88.65   | 117.02  | 13 9 82  | 153.7   | 83.57  |          |       |       | 13 9 82  | 3.91   | 7.82   |
| 23 1 83 358 358     | 23 1 83  | 56.38   | 64.54   | 23 1 83  | 48.51   | 59.56  |          |       |       | 23 1 83  | 3.91   | 3.91   |
| 23 1 83 384 358     | 23 1 83  | 66.31   | 64.54   | 23 1 83  | 47.55   | 59.56  |          |       |       | 23 1 83  | 3.91   | 3.91   |
| 4 4 83 403 400      | 4 4 83   | 61.7    | 63.83   | 4 4 83   | 57.64   | 18.25  |          |       |       | 25 3 84  | 11.73  | 11.73  |
| 4 4 83 393 400      | 4 4 83   | 65.6    | 63.83   | 4 4 83   | 44.67   | 18.25  |          |       |       | 11 7 84  | 3.9    | 11.7   |
| 25 3 84 320 281     | 25 3 84  | 50.7    | 51.06   | 25 3 84  | 38.42   | 36.98  |          |       |       | 2 8 84   | 3.9    | 3.9    |
| 22 5 84 499 492     | 22 5 84  | 78.05   | 83.65   | 22 5 84  | 48      | 55.2   |          |       |       | TOTAL    | 125.78 | 282.86 |
| 2 6 84 820 531      | 2 6 84   | 94.5    | 90.3    | 2 6 84   | 71.04   | 68.64  |          |       |       | MEAN     | 4.84   | 10.88  |
| 11 7 84 518 921     | 11 7 84  | 96.25   | 231.15  | 11 7 84  | 63.84   | 171.36 |          |       |       | S.D.     | 1.80   | 9.39   |
| 2 8 84 512 531      | 2 8 84   | 89.6    | 106.05  | 2 8 84   | 38.4    | 48     |          |       |       | (H)      | 1.76   | 9.21   |
| TOTAL 13868 19784   | TOTAL    | 2285.24 | 4509.89 | TOTAL    | 1635.85 | 341.13 |          |       |       | CORR.    |        | 0.34   |
| MEAN 462 659        | MEAN     | 76.17   | 150.33  | MEAN     | 54.50   | 111.37 |          |       |       | CON. (A) | (A)    | 2.17   |
| S.D. 106 339        | S.D.     | 18.42   | 113.34  | S.D.     | 25.51   | 102.06 |          |       |       | CON. (B) | (B)    | 1.80   |
| (H) 104 334         | (H)      | 18.11   | 111.44  | (H)      | 25.08   | 100.34 |          |       |       |          |        |        |
| CORR. 0.31          | CORR.    |         | 0.55    | CORR.    |         | 0.28   |          |       |       |          |        |        |
| CON. (A) (A) 197.00 | CON. (A) | (A)     | -109.41 | CON. (A) | (A)     | 49.79  |          |       |       |          |        |        |
| CON. (B) (B) 1.00   | CON. (B) | (B)     | 3.41    | CON. (B) | (B)     | 1.13   |          |       |       |          |        |        |

Table 14. CORRELATION between -- Yabis and Dier Alla (Dry season)

| DATE T.D.S T.D.S   | DATE     | CI     | CI       | DATE     | SO4    | SO4    | DATE     | NH4  | NH4  | DATE     | K     | K      |
|--------------------|----------|--------|----------|----------|--------|--------|----------|------|------|----------|-------|--------|
| 2 7 74 512 704     | 2 7 74   | 94.07  | 168.62   | 2 7 74   | 59.52  | 111.84 | 2 8 84   | 1    | 1    | 2 7 74   | 4.29  | 8.19   |
| 23 9 78 506 1280   | 23 9 78  | 95.03  | 326.23   | 23 9 78  | 55.71  | 288.18 | TOTAL    | 1.00 | 1.00 | 23 9 78  | 5.08  | 25.02  |
| 13 9 82 633 588    | 13 9 82  | 88.65  | 117.02   | 13 9 82  | 153.7  | 83.57  | MEAN     | 1.00 | 1.00 | 13 9 82  | 3.91  | 7.82   |
| 2 6 84 820 531     | 2 6 84   | 94.5   | 90.3     | 2 6 84   | 71.04  | 68.64  | S.D.     | 0.00 | 0.00 | 11 7 84  | 3.9   | 11.7   |
| 11 7 84 518 921    | 11 7 84  | 96.25  | 231.15   | 11 7 84  | 63.84  | 171.36 | (H)      | 0.00 | 0.00 | 2 8 84   | 3.9   | 3.9    |
| 2 8 84 512 531     | 2 8 84   | 89.6   | 106.05   | 2 8 84   | 38.4   | 48     | CORR.    |      | 0.00 | TOTAL    | 21.08 | 56.63  |
| TOTAL 3501 4555    | TOTAL    | 558.10 | 1039.37  | TOTAL    | 442.21 | 771.59 | CON. (A) | (A)  | 1.00 | MEAN     | 4.22  | 11.33  |
| MEAN 584 759       | MEAN     | 93.02  | 173.23   | MEAN     | 73.70  | 128.60 | CON. (B) | (B)  | 0.00 | S.D.     | 0.51  | 8.14   |
| S.D. 126 295       | S.D.     | 3.12   | 90.92    | S.D.     | 40.68  | 89.10  |          |      |      | (H)      | 0.46  | 7.28   |
| (H) 115 269        | (H)      | 2.84   | 83.00    | (H)      | 37.14  | 81.34  |          |      |      | CORR.    |       | 0.90   |
| CORR. -0.50        | CORR.    |        | 0.59     | CORR.    |        | -0.20  |          |      |      | CON. (A) | (A)   | -49.14 |
| CON. (A) (A) ***** | CON. (A) | (A)    | -1440.67 | CON. (A) | (A)    | 161.03 |          |      |      | CON. (B) | (B)   | 14.33  |
| CON. (B) (B) -1.18 | CON. (B) | (B)    | 17.35    | CON. (B) | (B)    | -0.44  |          |      |      |          |       |        |



Table 15. CORRELATION between - Yabis and Dier Alla (Rain season)

Table 15. CORRELATION between — Pabls and Diet Amd (Rum)

| DATE T.D.S T.D.S   |    |    |     | DATE CI CI |                       | DATE S04 S04 |    | DATE NH4 NH4 |        | DATE K K             |    |    |       |        |                   |      |      |                    |       |    |       |       |      |      |
|--------------------|----|----|-----|------------|-----------------------|--------------|----|--------------|--------|----------------------|----|----|-------|--------|-------------------|------|------|--------------------|-------|----|-------|-------|------|------|
| 15                 | 2  | 75 | 377 | 704        | 15                    | 2            | 75 | 57.15        | 197.38 | 15                   | 2  | 75 | 31.68 | 55.68  | 15                | 2    | 75   | 0.05               | 0.05  | 15 | 2     | 75    | 2.73 | 7.8  |
| 27                 | 4  | 75 | 528 | 659        | 27                    | 4            | 75 | 89.46        | 132.41 | 27                   | 4  | 75 | 70.56 | 108.48 | 27                | 4    | 75   | 0.18               | 0.21  | 27 | 4     | 75    | 4.68 | 6.24 |
| 22                 | 5  | 75 | 506 | 806        | 22                    | 5            | 75 | 88.75        | 198.8  | 22                   | 5  | 75 | 56.64 | 129.6  | 22                | 5    | 75   | 2.14               | 7.05  | 22 | 5     | 75    | 5.46 | 11.7 |
| 30                 | 3  | 75 | 396 | 569        | 30                    | 3            | 75 | 57.15        | 115.37 | 30                   | 3  | 75 | 43.2  | 86.4   | 30                | 3    | 75   | 0.88               | 0.71  | 30 | 3     | 75    | 2.73 | 6.24 |
| 10                 | 4  | 75 | 486 | 717        | 10                    | 4            | 75 | 74.55        | 153.36 | 10                   | 4  | 75 | 59.52 | 117.12 | 26                | 1    | 75   | 0.362              | 0.208 | 10 | 4     | 75    | 4.68 | 7.8  |
| 18                 | 11 | 75 | 531 | 659        | 18                    | 11           | 75 | 92.3         | 137.03 | 18                   | 11 | 75 | 59.04 | 126.70 | 27                | 11   | 76   | 4.8                | 0.48  | 18 | 11    | 75    | 5.46 | 8.2  |
| 26                 | 1  | 75 | 474 | 576        | 26                    | 1            | 75 | 80.58        | 114.31 | 26                   | 1  | 75 | 57.6  | 81.6   | 4                 | 4    | 76   | 0.49               | 0.40  | 26 | 1     | 75    | 3.9  | 5.07 |
| 27                 | 11 | 76 | 486 | 592        | 27                    | 11           | 76 | 85.45        | 117.73 | 27                   | 11 | 76 | 83.68 | 107.59 | 16                | 2    | 76   | 0.85               | 0.1   | 27 | 11    | 76    | 5.86 | 7.03 |
| 4                  | 4  | 76 | 442 | 544        | 4                     | 4            | 76 | 74.46        | 109.92 | 4                    | 4  | 76 | 62.43 | 81.65  | TOTAL             | 8.95 | 9.21 | 4                  | 4     | 76 | 5.47  | 7.82  |      |      |
| 16                 | 2  | 76 | 314 | 486        | 16                    | 2            | 76 | 48.58        | 91.84  | 16                   | 2  | 76 | 42.27 | 75.88  | MEAN              | 1.12 | 1.15 | 16                 | 2     | 76 | 3.91  | 6.64  |      |      |
| 8                  | 10 | 78 | 500 | 1059       | 8                     | 10           | 78 | 92.55        | 274.46 | 8                    | 10 | 78 | 70.12 | 215.17 | S.D.              | 1.64 | 2.39 | 8                  | 10    | 78 | 8.21  | 24.63 |      |      |
| 1                  | 5  | 79 | 528 | 1516       | 1                     | 5            | 79 | 102.12       | 469.84 | 1                    | 5  | 79 | 66.28 | 425.56 | (H)               | 1.53 | 2.24 | 1                  | 5     | 79 | 5.08  | 35.58 |      |      |
| 31                 | 3  | 79 | 486 | 582        | 31                    | 3            | 79 | 92.19        | 127.65 | 31                   | 3  | 79 | 59.07 | 98.46  | CORR.             |      | 0.29 | 31                 | 3     | 79 | 5.08  | 8.21  |      |      |
| 13                 | 2  | 79 | 480 | 595        | 13                    | 2            | 79 | 83.33        | 125.88 | 13                   | 2  | 79 | 36.94 | 67.24  | CON. (A)          | (A)  | 0.67 | 13                 | 2     | 79 | 4.3   | 7.42  |      |      |
| 1                  | 12 | 79 | 259 | 425        | 1                     | 12           | 79 | 40.78        | 88.65  | 1                    | 12 | 79 | 19.21 | 81.65  | CON. (B)          | (B)  | 0.43 | 1                  | 12    | 79 | 3.52  | 10.16 |      |      |
| 1                  | 10 | 79 | 466 | 1723       | 1                     | 10           | 79 | 90.07        | 511.33 | 1                    | 10 | 79 | 66.76 | 417.38 |                   |      |      | 1                  | 10    | 79 | 5.87  | 38.71 |      |      |
| 20                 | 1  | 80 | 342 | 319        | 20                    | 1            | 80 | 36.88        | 51.06  | 20                   | 1  | 80 | 5.76  | 21.13  |                   |      |      | 20                 | 1     | 80 | 3.91  | 3.91  |      |      |
| 17                 | 3  | 81 | 409 | 409        | 17                    | 3            | 81 | 62.05        | 62.05  | 17                   | 3  | 81 | 17.29 | 24.49  |                   |      |      | 17                 | 3     | 81 | 4.3   | 3.52  |      |      |
| 23                 | 1  | 83 | 384 | 358        | 23                    | 1            | 83 | 66.31        | 64.54  | 23                   | 1  | 83 | 47.55 | 59.56  |                   |      |      | 23                 | 1     | 83 | 3.91  | 3.91  |      |      |
| 23                 | 1  | 83 | 358 | 358        | 23                    | 1            | 83 | 56.38        | 64.54  | 23                   | 1  | 83 | 48.51 | 59.56  |                   |      |      | 23                 | 1     | 83 | 3.91  | 3.91  |      |      |
| 4                  | 4  | 83 | 393 | 400        | 4                     | 4            | 83 | 65.6         | 63.83  | 4                    | 4  | 83 | 44.67 | 18.25  |                   |      |      | 25                 | 3     | 84 | 11.73 | 11.73 |      |      |
| 4                  | 4  | 83 | 403 | 400        | 4                     | 4            | 83 | 61.7         | 63.83  | 4                    | 4  | 83 | 57.64 | 18.25  |                   |      |      | TOTAL 104.70226.23 |       |    |       |       |      |      |
| 22                 | 5  | 84 | 499 | 492        | 22                    | 5            | 84 | 78.05        | 83.65  | 22                   | 5  | 84 | 48    | 55.2   |                   |      |      | MEAN 4.99 10.77    |       |    |       |       |      |      |
| 25                 | 3  | 84 | 320 | 281        | 25                    | 3            | 84 | 50.7         | 51.06  | 25                   | 3  | 84 | 38.42 | 36.98  |                   |      |      | S.D. 1.97 9.85     |       |    |       |       |      |      |
| TOTAL 10367 15229  |    |    |     |            | TOTAL 1727.14 3470.52 |              |    |              |        | TOTAL 1192.842569.54 |    |    |       |        | (H) 1.92 9.61     |      |      |                    |       |    |       |       |      |      |
| MEAN 432 635       |    |    |     |            | MEAN 71.96 144.61     |              |    |              |        | MEAN 49.70 107.06    |    |    |       |        | CORR. 0.34        |      |      |                    |       |    |       |       |      |      |
| S.D. 77 351        |    |    |     |            | S.D. 18.26 119.29     |              |    |              |        | S.D. 18.46 106.35    |    |    |       |        | CON. (A) (A) 2.24 |      |      |                    |       |    |       |       |      |      |
| (H) 75 343         |    |    |     |            | (H) 17.87 116.78      |              |    |              |        | (H) 18.07 104.11     |    |    |       |        | CON. (B) (B) 1.71 |      |      |                    |       |    |       |       |      |      |
| CORR. 0.53         |    |    |     |            | CORR. 0.60            |              |    |              |        | CORR. 0.50           |    |    |       |        |                   |      |      |                    |       |    |       |       |      |      |
| CON. (A) (A) ***** |    |    |     |            | CON. (A) (A) -135.31  |              |    |              |        | CON. (A) (A) -35.58  |    |    |       |        |                   |      |      |                    |       |    |       |       |      |      |
| CON. (B) (B) 2.40  |    |    |     |            | CON. (B) (B) 3.89     |              |    |              |        | CON. (B) (B) 2.87    |    |    |       |        |                   |      |      |                    |       |    |       |       |      |      |

Table 16. CORRELATION between - Yabis and Dier Alla (Whole season)

| DATE C1/S04 C1/S04 |    |    |      | DATE CO3 CO3 |                     | DATE HC03 HC03 |    | DATE NO3 NO3          |       |    |    |    |        |        |    |                    |    |       |       |
|--------------------|----|----|------|--------------|---------------------|----------------|----|-----------------------|-------|----|----|----|--------|--------|----|--------------------|----|-------|-------|
| 2                  | 7  | 74 | 1.58 | 1.51         | 2                   | 7              | 74 | 6                     | 9     | 2  | 7  | 74 | 229.36 | 213.5  | 2  | 7                  | 74 | 6.63  | 12.26 |
| 26                 | 1  | 75 | 1.40 | 1.40         | 26                  | 1              | 75 | 5.4                   | 10.8  | 26 | 1  | 75 | 237.29 | 228.14 | 26 | 1                  | 75 | 9.61  | 11.82 |
| 15                 | 2  | 75 | 1.80 | 3.54         | 15                  | 2              | 75 | 9.6                   | 7.2   | 15 | 2  | 75 | 189.1  | 221.43 | 15 | 2                  | 75 | 11.6  | 11.52 |
| 30                 | 3  | 75 | 1.32 | 1.34         | 30                  | 3              | 75 | 11.1                  | 10.2  | 30 | 3  | 75 | 190.32 | 197.03 | 30 | 3                  | 75 | 7.53  | 8.59  |
| 10                 | 4  | 75 | 1.25 | 1.31         | 10                  | 4              | 75 | 9                     | 15.3  | 10 | 4  | 75 | 239.12 | 228.14 | 10 | 4                  | 75 | 10.63 | 11.51 |
| 27                 | 4  | 75 | 1.27 | 1.22         | 27                  | 4              | 75 | 17.1                  | 11.4  | 27 | 4  | 75 | 207.4  | 229.36 | 27 | 4                  | 75 | 14.04 | 14.49 |
| 22                 | 5  | 75 | 1.57 | 1.53         | 18                  | 11             | 75 | 9.6                   | 14.4  | 22 | 5  | 75 | 254.98 | 223.26 | 22 | 5                  | 75 | 12.49 | 10.19 |
| 18                 | 11 | 75 | 1.56 | 1.08         | 4                   | 4              | 76 | 9.47                  | 9.47  | 18 | 11 | 75 | 226.9  | 208.6  | 18 | 11                 | 75 | 14.53 | 16.39 |
| 16                 | 2  | 76 | 1.15 | 1.21         | 23                  | 9              | 78 | 10.08                 | 3.66  | 16 | 2  | 76 | 162.29 | 215.37 | 16 | 2                  | 76 | 17.53 | 10.63 |
| 4                  | 4  | 76 | 1.19 | 1.35         | 8                   | 10             | 78 | 9.77                  | 11.6  | 4  | 4  | 76 | 202.55 | 209.26 | 4  | 4                  | 76 | 10.63 | 18.27 |
| 27                 | 11 | 76 | 1.02 | 1.09         | 13                  | 2              | 79 | 12.83                 | 15.27 | 27 | 11 | 76 | 198.89 | 231.84 | 27 | 11                 | 76 | 11.6  | 11.07 |
| 23                 | 9  | 78 | 1.71 | 1.13         | 31                  | 3              | 79 | 15.88                 | 4.88  | 23 | 9  | 78 | 226.95 | 255.02 | 23 | 9                  | 78 | 23.96 | 42.08 |
| 8                  | 10 | 78 | 1.32 | 1.28         | 1                   | 10             | 79 | 15.89                 | 6.11  | 8  | 10 | 78 | 203.77 | 201.94 | 8  | 10                 | 78 | 29.69 | 13.95 |
| 13                 | 2  | 79 | 2.26 | 1.87         | 17                  | 3              | 81 | 10.99                 | 9.78  | 13 | 2  | 79 | 224.51 | 225.73 | 13 | 2                  | 79 | 11.95 | 12.18 |
| 31                 | 3  | 79 | 1.56 | 1.30         | 23                  | 1              | 83 | 5.8                   | 3.67  | 31 | 3  | 79 | 111.67 | 234.27 | 31 | 3                  | 79 | 11.07 | 9.74  |
| 1                  | 5  | 79 | 1.54 | 1.10         | 23                  | 1              | 83 | 5.19                  | 3.67  | 1  | 5  | 79 | 241.59 | 280.64 | 1  | 5                  | 79 | 15    | 17.27 |
| 1                  | 10 | 79 | 1.35 | 1.23         | 4                   | 4              | 83 | 3.67                  | 6.11  | 1  | 10 | 79 | 206.21 | 222.08 | 1  | 10                 | 79 | 13.7  | 9.75  |
| 1                  | 12 | 79 | 2.12 | 1.09         | 22                  | 5              | 84 | 11.04                 | 15    | 1  | 12 | 79 | 135.44 | 158.63 | 1  | 12                 | 79 | 17.2  | 17.28 |
| 20                 | 1  | 80 | 6.40 | 2.42         | 2                   | 6              | 84 | 3.6                   | 15.6  | 20 | 1  | 80 | 222.08 | 160.46 | 20 | 1                  | 80 | 33.8  | 21.26 |
| 17                 | 3  | 81 | 3.59 | 2.53         | 11                  | 7              | 84 | 16.5                  | 13.2  | 17 | 3  | 81 | 200.72 | 202.55 | 17 | 3                  | 81 | 23.9  | 22.24 |
| 13                 | 9  | 82 | 0.58 | 1.40         | 2                   | 8              | 84 | 2.4                   | 4.5   | 13 | 9  | 82 | 272.1  | 263.56 | 13 | 9                  | 82 | 8.8   | 9.26  |
| 23                 | 1  | 83 | 1.16 | 1.08         | TOTAL 200.91 200.82 |                |    |                       |       | 23 | 1  | 83 | 199.5  | 161.68 | 23 | 1                  | 83 | 13.1  | 14.13 |
| 23                 | 1  | 83 | 1.39 | 1.08         | MEAN 9.57 9.56      |                |    |                       |       | 23 | 1  | 83 | 189.74 | 161.68 | 23 | 1                  | 83 | 12.1  | 14.13 |
| 4                  | 4  | 83 | 1.07 | 3.50         | S.D. 4.40 4.24      |                |    |                       |       | 4  | 4  | 83 | 198.89 | 208.65 | 4  | 4                  | 83 | 10.9  | 34.19 |
| 4                  | 4  | 83 | 1.47 | 3.50         | (H) 4.30 4.14       |                |    |                       |       | 4  | 4  | 83 | 204.99 | 208.65 | 4  | 4                  | 83 | 10    | 34.19 |
| 25                 | 3  | 84 | 1.32 | 1.38         | CORR. 0.20          |                |    |                       |       | 25 | 3  | 84 | 142.76 | 151.3  | 25 | 3                  | 84 | 7.7   | 9.57  |
| 22                 | 5  | 84 | 1.63 | 1.52         | CON. (A) (A) 7.74   |                |    |                       |       | 22 | 5  | 84 | 230.58 | 217.77 | 22 | 5                  | 84 | 11    | 9.5   |
| 2                  | 6  | 84 | 1.33 | 1.32         | CON. (B) (B) 0.19   |                |    |                       |       | 2  | 6  | 84 | 222.65 | 206.18 | 2  | 6                  | 84 | 10.8  | 9.6   |
| 11                 | 7  | 84 | 1.51 | 1.35         |                     |                |    |                       |       | 11 | 7  | 84 | 203.13 | 237.7  | 11 | 7                  | 84 | 9.2   | 23.2  |
| 2                  | 8  | 84 | 2.33 | 2.21         |                     |                |    |                       |       | 2  | 8  | 84 | 264.74 | 262.3  | 2  | 8                  | 84 | 8.3   | 10    |
| TOTAL 50.75 48.87  |    |    |      |              |                     |                |    | TOTAL 6240.22 6426.72 |       |    |    |    |        |        |    | TOTAL 408.99470.26 |    |       |       |
| MEAN 1.69 1.63     |    |    |      |              |                     |                |    | MEAN 208.01 214.22    |       |    |    |    |        |        |    | MEAN 13.63 15.68   |    |       |       |
| S.D. 1.03 0.74     |    |    |      |              |                     |                |    | S.D. 35.78 31.77      |       |    |    |    |        |        |    | S.D. 6.41 8.29     |    |       |       |
| (H) 1.01 0.73      |    |    |      |              |                     |                |    | (H) 35.18 31.24       |       |    |    |    |        |        |    | (H) 6.30 8.15      |    |       |       |
| CORR. 0.32         |    |    |      |              |                     |                |    | CORR. 0.52            |       |    |    |    |        |        |    | CORR. 0.34         |    |       |       |
| CON. (A) (A) 1.24  |    |    |      |              |                     |                |    | CON. (A) (A) 118.54   |       |    |    |    |        |        |    | CON. (A) (A) 9.68  |    |       |       |
| CON. (B) (B) 0.23  |    |    |      |              |                     |                |    | CON. (B) (B) 0.46     |       |    |    |    |        |        |    | CON. (B) (B) 0.44  |    |       |       |

Table 17. CORRELATION between — Yabis and Dier Alla (Dry season)

| DATE     | C1/S04 | C1/S04 | DATE     | C03   | C03   | DATE     | HC03    | HC03    | DATE     | N03   | N03    |
|----------|--------|--------|----------|-------|-------|----------|---------|---------|----------|-------|--------|
| 2 7 74   | 1.58   | 1.51   | 2 7 74   | 6     | 9     | 2 7 74   | 229.36  | 213.5   | 2 7 74   | 6.63  | 12.26  |
| 23 9 78  | 1.71   | 1.13   | 23 9 78  | 10.08 | 3.66  | 23 9 78  | 226.95  | 255.02  | 23 9 78  | 23.96 | 42.08  |
| 13 9 82  | 0.58   | 1.40   | 2 6 84   | 3.6   | 15.6  | 13 9 82  | 272.1   | 263.56  | 13 9 82  | 8.8   | 9.26   |
| 2 6 84   | 1.33   | 1.32   | 11 7 84  | 16.5  | 13.2  | 2 6 84   | 222.65  | 206.18  | 2 6 84   | 10.8  | 9.6    |
| 11 7 84  | 1.51   | 1.35   | 2 8 84   | 2.4   | 4.5   | 11 7 84  | 203.13  | 237.7   | 11 7 84  | 9.2   | 23.2   |
| 2 8 84   | 2.33   | 2.21   | TOTAL    | 38.58 | 45.96 | 2 8 84   | 264.74  | 262.3   | 2 8 84   | 8.3   | 10     |
| TOTAL    | 9.04   | 8.92   | MEAN     | 7.72  | 9.19  | TOTAL    | 1418.93 | 1438.26 | TOTAL    | 67.69 | 106.40 |
| MEAN     | 1.51   | 1.49   | S.D.     | 5.72  | 5.24  | MEAN     | 236.49  | 239.71  | MEAN     | 11.28 | 17.73  |
| S.D.     | 0.57   | 0.37   | (H)      | 5.12  | 4.69  | S.D.     | 26.50   | 25.02   | S.D.     | 6.36  | 13.04  |
| (H)      | 0.52   | 0.35   | CORR.    |       | 0.18  | (H)      | 24.20   | 22.84   | (H)      | 5.80  | 11.91  |
| CORR.    |        | 0.62   | CON. (A) | (A)   | 7.95  | CORR.    |         | 0.62    | CORR.    |       | 0.89   |
| CON. (A) | (A)    | 0.90   | CON. (B) | (B)   | 0.16  | CON. (A) | (A)     | 100.18  | CON. (A) | (A)   | -3.03  |
| CON. (B) | (B)    | 0.39   |          |       |       | CON. (B) | (B)     | 0.59    | CON. (B) | (B)   | 1.84   |

Table 18. CORRELATION between — Yabis and Dier Alla (Rain season)

| DATE     | C1/S04 | C1/S04 | DATE     | C03    | C03    | DATE     | HC03    | HC03    | DATE     | N03    | N03    |
|----------|--------|--------|----------|--------|--------|----------|---------|---------|----------|--------|--------|
| 15 2 75  | 1.80   | 3.54   | 15 2 75  | 9.6    | 7.2    | 15 2 75  | 189.1   | 221.43  | 15 2 75  | 11.6   | 11.52  |
| 27 4 75  | 1.27   | 1.22   | 27 4 75  | 17.1   | 11.4   | 27 4 75  | 207.4   | 229.36  | 27 4 75  | 14.04  | 14.49  |
| 22 5 75  | 1.57   | 1.53   | 30 3 75  | 11.1   | 10.2   | 22 5 75  | 254.98  | 223.26  | 22 5 75  | 12.49  | 10.19  |
| 30 3 75  | 1.32   | 1.34   | 10 4 75  | 9      | 15.3   | 30 3 75  | 190.32  | 197.03  | 30 3 75  | 7.53   | 8.59   |
| 10 4 75  | 1.25   | 1.31   | 18 11 75 | 9.6    | 14.4   | 10 4 75  | 239.12  | 228.14  | 10 4 75  | 10.63  | 11.51  |
| 18 11 75 | 1.56   | 1.08   | 26 1 75  | 5.4    | 10.8   | 18 11 75 | 226.9   | 208.6   | 18 11 75 | 14.53  | 16.39  |
| 26 1 75  | 1.40   | 1.40   | 4 4 76   | 9.47   | 9.47   | 26 1 75  | 237.29  | 228.14  | 26 1 75  | 9.61   | 11.82  |
| 27 11 76 | 1.02   | 1.09   | 8 10 78  | 9.77   | 11.6   | 27 11 76 | 198.89  | 231.84  | 27 11 76 | 11.6   | 11.07  |
| 4 4 76   | 1.19   | 1.35   | 31 3 79  | 15.88  | 4.88   | 4 4 76   | 202.55  | 209.26  | 4 4 76   | 10.63  | 18.27  |
| 16 2 76  | 1.15   | 1.21   | 13 2 79  | 12.83  | 15.27  | 16 2 76  | 162.29  | 215.37  | 16 2 76  | 17.53  | 10.63  |
| 8 10 78  | 1.32   | 1.28   | 1 10 79  | 15.89  | 6.11   | 8 10 78  | 203.77  | 201.94  | 8 10 78  | 29.69  | 13.95  |
| 1 5 79   | 1.54   | 1.10   | 17 3 81  | 10.99  | 9.78   | 1 5 79   | 241.59  | 280.64  | 1 5 79   | 15     | 17.27  |
| 31 3 79  | 1.56   | 1.30   | 23 1 83  | 5.19   | 3.67   | 31 3 79  | 111.67  | 234.27  | 31 3 79  | 11.07  | 9.74   |
| 13 2 79  | 2.26   | 1.87   | 23 1 83  | 5.8    | 3.67   | 13 2 79  | 224.51  | 225.73  | 13 2 79  | 11.95  | 12.18  |
| 1 12 79  | 2.12   | 1.09   | 4 4 83   | 3.67   | 6.11   | 1 12 79  | 135.44  | 158.63  | 1 12 79  | 17.2   | 17.28  |
| 1 10 79  | 1.35   | 1.23   | 22 5 84  | 11.04  | 15     | 1 10 79  | 206.21  | 222.08  | 1 10 79  | 13.7   | 9.75   |
| 20 1 80  | 6.40   | 2.42   | TOTAL    | 162.33 | 154.86 | 20 1 80  | 222.08  | 160.46  | 20 1 80  | 33.8   | 21.26  |
| 17 3 81  | 3.59   | 2.53   | MEAN     | 10.15  | 9.68   | 17 3 81  | 200.72  | 202.55  | 17 3 81  | 23.9   | 22.24  |
| 23 1 83  | 1.39   | 1.08   | S.D.     | 3.95   | 4.07   | 23 1 83  | 189.74  | 161.68  | 23 1 83  | 12.1   | 14.13  |
| 23 1 83  | 1.16   | 1.08   | (H)      | 3.83   | 3.94   | 23 1 83  | 199.5   | 161.68  | 23 1 83  | 13.1   | 14.13  |
| 4 4 83   | 1.47   | 3.50   | CORR.    |        | 0.21   | 4 4 83   | 204.99  | 208.65  | 4 4 83   | 10     | 34.19  |
| 4 4 83   | 1.07   | 3.50   | CON. (A) | (A)    | 7.55   | 4 4 83   | 198.89  | 208.65  | 4 4 83   | 10.9   | 34.19  |
| 22 5 84  | 1.63   | 1.52   | CON. (B) | (B)    | 0.21   | 22 5 84  | 230.58  | 217.77  | 22 5 84  | 11     | 9.5    |
| 25 3 84  | 1.32   | 1.38   |          |        |        | 25 3 84  | 142.76  | 151.3   | 25 3 84  | 7.7    | 9.57   |
| TOTAL    | 41.71  | 39.95  |          |        |        | TOTAL    | 4821.29 | 4988.46 | TOTAL    | 341.30 | 363.86 |
| MEAN     | 1.74   | 1.66   |          |        |        | MEAN     | 200.89  | 207.85  | MEAN     | 14.22  | 15.16  |
| S.D.     | 1.13   | 0.81   |          |        |        | S.D.     | 34.60   | 30.41   | S.D.     | 6.42   | 6.95   |
| (H)      | 1.10   | 0.79   |          |        |        | (H)      | 33.87   | 29.77   | (H)      | 6.29   | 6.80   |
| CORR.    |        | 0.29   |          |        |        | CORR.    |         | 0.40    | CORR.    |        | 0.19   |
| CON. (A) | (A)    | 1.29   |          |        |        | CON. (A) | (A)     | 137.54  | CON. (A) | (A)    | 12.32  |
| CON. (B) | (B)    | 0.21   |          |        |        | CON. (B) | (B)     | 0.35    | CON. (B) | (B)    | 0.20   |

Table 19. CORRELATION between -- Yabis and Dier Alla (Whole season)

| DATE          | Ca     | Ca     | DATE         | Hg     | Hg    | DATE          | Na      | Na     | DATE     | Ca/Hg/Na+K | Ca/Hg/Na+K |
|---------------|--------|--------|--------------|--------|-------|---------------|---------|--------|----------|------------|------------|
| 2 7 74        | 53.8   | 62     | 2 7 74       | 30.66  | 42.31 | 2 7 74        | 62.1    | 97.75  | 2 7 74   | 1.27       | 0.98       |
| 26 1 75       | 47.2   | 58     | 26 1 75      | 27.23  | 31.61 | 26 1 75       | 63.25   | 82.8   | 26 1 75  | 1.11       | 1.02       |
| 15 2 75       | 38.4   | 57.2   | 15 2 75      | 21.03  | 37.33 | 15 2 75       | 51.75   | 111.55 | 15 2 75  | 1.09       | 0.79       |
| 30 3 75       | 40     | 53     | 30 3 75      | 21.88  | 31.61 | 30 3 75       | 51.75   | 78.2   | 30 3 75  | 1.14       | 1.00       |
| 10 4 75       | 52     | 70     | 10 4 75      | 27.23  | 38.18 | 10 4 75       | 63.25   | 101.2  | 10 4 75  | 1.17       | 0.99       |
| 27 4 75       | 52.4   | 63.4   | 27 4 75      | 26.99  | 31.49 | 27 4 75       | 51.75   | 92     | 27 4 75  | 1.41       | 0.97       |
| 22 5 75       | 52     | 68     | 22 5 75      | 27.22  | 42.56 | 22 5 75       | 70.15   | 124.2  | 22 5 75  | 1.05       | 0.81       |
| 18 11 75      | 51.6   | 74.8   | 18 11 75     | 24.7   | 32.2  | 18 11 75      | 82.8    | 90.8   | 18 11 75 | 0.86       | 1.08       |
| 16 2 76       | 32.86  | 48.09  | 16 2 76      | 14.59  | 53.59 | 16 2 76       | 45.98   | 71.26  | 16 2 76  | 0.95       | 1.31       |
| 4 4 76        | 43.28  | 50.9   | 4 4 76       | 22.37  | 31.12 | 4 4 76        | 65.52   | 74.32  | 4 4 76   | 0.92       | 1.00       |
| 27 11 76      | 46.89  | 56.11  | 27 11 76     | 24.56  | 30.4  | 27 11 76      | 70.11   | 89.66  | 27 11 76 | 0.94       | 0.89       |
| 23 9 78       | 43.28  | 110.62 | 23 9 78      | 28.21  | 53.5  | 23 9 78       | 85.06   | 224.15 | 23 9 78  | 0.79       | 0.66       |
| 8 10 78       | 46.49  | 76.55  | 8 10 78      | 25.77  | 51.55 | 8 10 78       | 79.31   | 163.23 | 8 10 78  | 0.83       | 0.68       |
| 13 2 79       | 45.09  | 45.09  | 13 2 79      | 21.23  | 26.99 | 13 2 79       | 75.86   | 105.75 | 13 2 79  | 0.83       | 0.64       |
| 31 3 79       | 47.29  | 55.51  | 31 3 79      | 28.08  | 33.07 | 31 3 79       | 72.4    | 97.7   | 31 3 79  | 0.97       | 0.84       |
| 1 5 79        | 53.5   | 146.29 | 1 5 79       | 29.91  | 74.29 | 1 5 79        | 78.16   | 291.97 | 1 5 79   | 1.00       | 0.67       |
| 1 10 79       | 43.09  | 127.65 | 1 10 79      | 30.04  | 79.04 | 1 10 79       | 74.72   | 312.66 | 1 10 79  | 0.91       | 0.59       |
| 1 12 79       | 36.07  | 58.71  | 1 12 79      | 0.24   | 15.44 | 1 12 79       | 33.34   | 59.77  | 1 12 79  | 0.99       | 1.06       |
| 20 1 80       | 51.91  | 36.67  | 20 1 80      | 21.77  | 13.98 | 20 1 80       | 20.69   | 45.98  | 20 1 80  | 3.00       | 1.02       |
| 17 3 81       | 48.69  | 49.29  | 17 3 81      | 18.96  | 18.24 | 17 3 81       | 46.44   | 48.5   | 17 3 81  | 1.33       | 1.30       |
| 13 9 82       | 56.11  | 67.33  | 13 9 82      | 53.5   | 27.24 | 13 9 82       | 71.27   | 82.76  | 13 9 82  | 1.46       | 1.04       |
| 23 1 83       | 48.9   | 52.91  | 23 1 83      | 19.7   | 17.02 | 23 1 83       | 45.7    | 43.68  | 23 1 83  | 1.38       | 1.47       |
| 23 1 83       | 47.9   | 52.91  | 23 1 83      | 16.54  | 17.02 | 23 1 83       | 59.77   | 43.68  | 23 1 83  | 1.01       | 1.47       |
| 4 4 83        | 46.49  | 48.1   | 4 4 83       | 20.67  | 19.21 | 4 4 83        | 55.18   | 52.88  | 25 3 84  | 0.81       | 1.07       |
| 4 4 83        | 45.69  | 48.1   | 4 4 83       | 19.94  | 19.21 | 4 4 83        | 52.88   | 52.88  | 11 7 84  | 0.98       | 0.92       |
| 25 3 84       | 32.86  | 36.67  | 25 3 84      | 13.62  | 12.88 | 25 3 84       | 45.98   | 34.48  | 2 8 84   | 1.84       | 0.97       |
| 22 5 84       | 50.06  | 47.2   | 22 5 84      | 25.92  | 25.92 | 22 5 84       | 66.07   | 71.3   | TOTAL    | 30.04      | 25.24      |
| 2 6 84        | 53     | 51     | 2 6 84       | 23.4   | 26.4  | 2 6 84        | 80.5    | 75.9   | MEAN     | 1.16       | 0.97       |
| 11 7 84       | 47.6   | 89.6   | 11 7 84      | 28.44  | 43.91 | 11 7 84       | 73.6    | 133.4  | S.D.     | 0.45       | 0.22       |
| 2 8 84        | 55     | 75.4   | 2 8 84       | 83.64  | 10.8  | 2 8 84        | 71.3    | 85.1   | (H)      | 0.44       | 0.22       |
| TOTAL 1409.45 | 937.10 |        | TOTAL 778.04 | 988.11 |       | TOTAL 1866.64 | 3039.51 |        | CORR.    |            | 0.20       |
| MEAN          | 46.98  | 64.57  | MEAN         | 25.93  | 32.94 | MEAN          | 62.22   | 101.32 | CON. (A) | (A)        | 0.83       |
| S.D.          | 6.17   | 25.03  | S.D.         | 13.71  | 16.83 | S.D.          | 15.31   | 66.96  | CON. (B) | (B)        | 0.12       |
| (H)           | 6.07   | 24.61  | (H)          | 13.48  | 16.55 | (H)           | 15.05   | 65.83  |          |            |            |
| CORR.         | 0.21   |        | CORR.        | 0.02   |       | CORR.         | 0.57    |        |          |            |            |
| CON. (A)      | (A)    | 25.11  | CON. (A)     | (A)    | 32.16 | CON. (A)      | (A)     | -52.99 |          |            |            |
| CON. (B)      | (B)    | 0.84   | CON. (B)     | (B)    | 0.03  | CON. (B)      | (B)     | 2.48   |          |            |            |

Table 20. CORRELATION between -- Yabis and Dier Alla (Dry season)

| DATE         | Ca     | Ca     | DATE         | Hg     | Hg    | DATE         | Na     | Na      | DATE     | Ca/Hg/Na+K | Ca/Hg/Na+K |
|--------------|--------|--------|--------------|--------|-------|--------------|--------|---------|----------|------------|------------|
| 2 7 74       | 53.8   | 62     | 2 7 74       | 30.66  | 42.31 | 2 7 74       | 62.1   | 97.75   | 2 7 74   | 1.27       | 0.98       |
| 23 9 78      | 43.28  | 110.62 | 23 9 78      | 28.21  | 53.5  | 23 9 78      | 85.06  | 224.15  | 23 9 78  | 0.79       | 0.66       |
| 13 9 82      | 56.11  | 67.33  | 13 9 82      | 53.5   | 27.24 | 13 9 82      | 71.27  | 82.76   | 13 9 82  | 1.46       | 1.04       |
| 2 6 84       | 53     | 51     | 2 6 84       | 23.4   | 26.4  | 2 6 84       | 80.5   | 75.9    | 11 7 84  | 0.98       | 0.92       |
| 11 7 84      | 47.6   | 89.6   | 11 7 84      | 28.44  | 43.91 | 11 7 84      | 73.6   | 133.4   | 2 8 84   | 1.84       | 0.97       |
| 2 8 84       | 55     | 75.4   | 2 8 84       | 83.64  | 10.8  | 2 8 84       | 71.3   | 85.1    | TOTAL    | 6.34       | 4.57       |
| TOTAL 308.79 | 455.95 |        | TOTAL 247.85 | 204.16 |       | TOTAL 443.83 | 699.06 |         | MEAN     | 1.27       | 0.91       |
| MEAN         | 51.47  | 75.99  | MEAN         | 41.31  | 34.03 | MEAN         | 73.97  | 116.51  | S.D.     | 0.41       | 0.14       |
| S.D.         | 4.98   | 21.35  | S.D.         | 23.29  | 15.42 | S.D.         | 8.01   | 56.57   | (H)      | 0.36       | 0.14       |
| (H)          | 4.54   | 19.49  | (H)          | 21.26  | 14.08 | (H)          | 7.32   | 51.64   | CORR.    |            | 0.67       |
| CORR.        | -0.85  |        | CORR.        | 0.78   |       | CORR.        | 0.58   |         | CON. (A) | (A)        | 0.59       |
| CON. (A)     | (A)    | 262.83 | CON. (A)     | (A)    | 55.51 | CON. (A)     | (A)    | -187.51 | CON. (B) | (B)        | 0.25       |
| CON. (B)     | (B)    | -3.63  | CON. (B)     | (B)    | -0.52 | CON. (B)     | (B)    | 4.11    |          |            |            |

Table 21. CORRELATION between – Yabis and Dier Alla (Rain season)

| DATE          | Ca      | Cn           | DATE     | Hg            | Hg      | DATE          | Na      | Na     | DATE     | Ca+Hg/Na+K | Ca+Hg/Na+K |
|---------------|---------|--------------|----------|---------------|---------|---------------|---------|--------|----------|------------|------------|
| 15 2 75       | 38.4    | 57.2         | 15 2 75  | 21.03         | 37.33   | 15 2 75       | 51.75   | 111.55 | 15 2 75  | 1.09       | 0.79       |
| 27 4 75       | 52.4    | 63.4         | 27 4 75  | 26.99         | 31.49   | 27 4 75       | 51.75   | 92     | 27 4 75  | 1.41       | 0.97       |
| 22 5 75       | 52      | 68           | 22 5 75  | 27.22         | 42.56   | 22 5 75       | 70.15   | 124.2  | 22 5 75  | 1.05       | 0.81       |
| 30 3 75       | 40      | 53           | 30 3 75  | 21.88         | 31.61   | 30 3 75       | 51.75   | 78.2   | 30 3 75  | 1.14       | 1.00       |
| 10 4 75       | 52      | 70           | 10 4 75  | 27.23         | 38.18   | 10 4 75       | 63.25   | 101.2  | 10 4 75  | 1.17       | 0.99       |
| 18 11 75      | 51.6    | 74.8         | 18 11 75 | 24.7          | 32.2    | 18 11 75      | 82.8    | 90.8   | 18 11 75 | 0.86       | 1.04       |
| 26 1 75       | 47.2    | 58           | 26 1 75  | 27.23         | 31.61   | 26 1 75       | 63.25   | 82.8   | 26 1 75  | 1.11       | 1.02       |
| 27 11 76      | 46.89   | 56.11        | 27 11 76 | 24.56         | 30.4    | 27 11 76      | 70.11   | 89.66  | 27 11 76 | 0.94       | 0.89       |
| 4 4 76        | 43.28   | 50.9         | 4 4 76   | 22.37         | 31.12   | 4 4 76        | 65.52   | 74.32  | 4 4 76   | 0.92       | 1.00       |
| 16 2 76       | 32.86   | 48.09        | 16 2 76  | 14.59         | 53.59   | 16 2 76       | 45.98   | 71.26  | 16 2 76  | 0.95       | 1.31       |
| 8 10 78       | 46.49   | 76.55        | 8 10 78  | 25.77         | 51.55   | 8 10 78       | 79.31   | 163.23 | 8 10 78  | 0.83       | 0.68       |
| 1 5 79        | 53.5    | 146.29       | 1 5 79   | 29.91         | 74.29   | 1 5 79        | 78.16   | 291.97 | 1 5 79   | 1.00       | 0.67       |
| 31 3 79       | 47.29   | 55.51        | 31 3 79  | 28.08         | 33.07   | 31 3 79       | 72.4    | 97.7   | 31 3 79  | 0.97       | 0.84       |
| 13 2 79       | 45.09   | 45.09        | 13 2 79  | 21.23         | 26.99   | 13 2 79       | 75.86   | 105.75 | 13 2 79  | 0.83       | 0.64       |
| 1 12 79       | 36.07   | 58.71        | 1 12 79  | 0.24          | 15.44   | 1 12 79       | 33.34   | 59.77  | 1 12 79  | 0.99       | 1.06       |
| 1 10 79       | 43.09   | 127.65       | 1 10 79  | 30.04         | 79.04   | 1 10 79       | 74.72   | 312.66 | 1 10 79  | 0.91       | 0.59       |
| 20 1 80       | 51.91   | 36.67        | 20 1 80  | 21.77         | 13.98   | 20 1 80       | 20.69   | 45.98  | 20 1 80  | 3.00       | 1.02       |
| 17 3 81       | 48.69   | 49.29        | 17 3 81  | 18.96         | 18.24   | 17 3 81       | 46.44   | 48.5   | 17 3 81  | 1.33       | 1.30       |
| 23 1 83       | 47.9    | 52.91        | 23 1 83  | 16.54         | 17.02   | 23 1 83       | 59.77   | 43.68  | 23 1 83  | 1.01       | 1.47       |
| 23 1 83       | 48.9    | 52.91        | 23 1 83  | 19.7          | 17.02   | 23 1 83       | 45.7    | 43.68  | 23 1 83  | 1.38       | 1.47       |
| 4 4 83        | 45.69   | 48.1         | 4 4 83   | 19.94         | 19.21   | 4 4 83        | 52.88   | 52.88  | 25 3 84  | 0.81       | 1.07       |
| 4 4 83        | 46.49   | 48.1         | 4 4 83   | 20.67         | 19.21   | 4 4 83        | 55.18   | 52.88  | TOTAL    | 23.70      | 20.67      |
| 22 5 84       | 50.06   | 47.2         | 22 5 84  | 25.92         | 25.92   | 22 5 84       | 66.07   | 71.3   | MEAN     | 1.13       | 0.98       |
| 25 3 84       | 32.86   | 36.67        | 25 3 84  | 13.62         | 12.88   | 25 3 84       | 45.98   | 34.48  | S.D.     | 0.46       | 0.24       |
| TOTAL 1100.66 | 1481.15 | TOTAL 530.19 | 783.95   | TOTAL 1422.81 | 2340.45 | TOTAL 1422.81 | 2340.45 | (N)    | 0.45     | 0.24       |            |
| MEAN          | 45.86   | 61.71        | MEAN     | 22.09         | 32.66   | MEAN          | 59.28   | 97.52  | CORR.    |            | 0.18       |
| S.D.          | 6.01    | 25.47        | S.D.     | 6.48          | 17.46   | S.D.          | 15.38   | 69.87  | CON. (A) | (A)        | 0.87       |
| (N)           | 5.88    | 24.93        | (N)      | 6.34          | 17.10   | (N)           | 15.06   | 68.40  | CON. (B) | (B)        | 0.10       |
| CORR.         |         | 0.28         | CORR.    |               | 0.54    | CORR.         |         | 0.57   |          |            |            |
| CON. (A)      | (A)     | 7.14         | CON. (A) | (A)           | 0.41    | CON. (A)      | (A)     | -56.61 |          |            |            |
| CON. (B)      | (B)     | 1.19         | CON. (B) | (B)           | 1.46    | CON. (B)      | (B)     | 2.60   |          |            |            |

Table 22. CORRELATION between – Yabis and Dier Alla (Whole season)

| DATE        | T.D.S | T.D.S         | DATE     | CI            | CI      | DATE          | SO4     | SO4    | DATE     | NH4   | NH4   | DATE         | K      | K     |
|-------------|-------|---------------|----------|---------------|---------|---------------|---------|--------|----------|-------|-------|--------------|--------|-------|
| 2 7 74      | 512   | 704           | 2 7 74   | 94.07         | 168.62  | 2 7 74        | 59.52   | 111.84 | 26 1 75  | 0.362 | 0.208 | 2 7 74       | 4.29   | 8.19  |
| 26 1 75     | 474   | 576           | 26 1 75  | 80.58         | 114.31  | 26 1 75       | 57.6    | 81.6   | 15 2 75  | 0.05  | 0.05  | 26 1 75      | 3.9    | 5.07  |
| 15 2 75     | 377   | 704           | 15 2 75  | 57.15         | 197.38  | 15 2 75       | 31.68   | 55.68  | 30 3 75  | 0.88  | 0.71  | 15 2 75      | 2.73   | 7.8   |
| 30 3 75     | 396   | 569           | 30 3 75  | 57.15         | 115.37  | 30 3 75       | 43.2    | 86.4   | 27 4 75  | 0.18  | 0.21  | 30 3 75      | 2.73   | 6.24  |
| 10 4 75     | 486   | 717           | 10 4 75  | 74.55         | 153.36  | 10 4 75       | 59.52   | 117.12 | 22 5 75  | 2.14  | 7.05  | 10 4 75      | 4.68   | 7.8   |
| 27 4 75     | 528   | 659           | 27 4 75  | 89.46         | 132.41  | 27 4 75       | 70.56   | 108.48 | 16 2 76  | 0.05  | 0.1   | 27 4 75      | 4.68   | 6.24  |
| 22 5 75     | 506   | 806           | 22 5 75  | 88.75         | 198.8   | 22 5 75       | 56.64   | 129.6  | 4 4 76   | 0.49  | 0.40  | 22 5 75      | 5.46   | 11.7  |
| 18 11 75    | 531   | 659           | 18 11 75 | 92.3          | 137.03  | 18 11 75      | 59.04   | 126.70 | 27 11 76 | 4.8   | 0.48  | 18 11 75     | 5.46   | 8.2   |
| 16 2 76     | 314   | 486           | 16 2 76  | 48.58         | 91.84   | 16 2 76       | 42.27   | 75.88  | 2 8 84   | 1     | 1     | 16 2 76      | 3.91   | 6.64  |
| 4 4 76      | 442   | 544           | 4 4 76   | 74.46         | 109.92  | 4 4 76        | 62.43   | 81.65  | TOTAL    | 9.95  | 10.21 | 4 4 76       | 5.47   | 7.82  |
| 27 11 76    | 486   | 592           | 27 11 76 | 85.45         | 117.73  | 27 11 76      | 83.68   | 107.59 | MEAN     | 1.11  | 1.13  | 27 11 76     | 5.86   | 7.03  |
| 13 2 79     | 480   | 595           | 13 2 79  | 83.33         | 125.88  | 13 2 79       | 36.94   | 67.24  | S.D.     | 1.53  | 2.24  | 13 2 79      | 4.3    | 7.42  |
| 31 3 79     | 486   | 582           | 31 3 79  | 92.19         | 127.65  | 31 3 79       | 59.07   | 98.46  | (N)      | 1.45  | 2.11  | 31 3 79      | 5.08   | 8.21  |
| 1 12 79     | 259   | 425           | 1 12 79  | 40.78         | 88.65   | 1 12 79       | 19.21   | 81.65  | CORR.    |       | 0.29  | 1 12 79      | 3.52   | 10.16 |
| 20 1 80     | 342   | 319           | 20 1 80  | 36.88         | 51.06   | 20 1 80       | 5.76    | 21.13  | CON. (A) | (A)   | 0.65  | 20 1 80      | 3.91   | 3.91  |
| 17 3 81     | 409   | 409           | 17 3 81  | 62.05         | 62.05   | 17 3 81       | 17.29   | 24.49  | CON. (B) | (B)   | 0.43  | 17 3 81      | 4.3    | 3.52  |
| 13 9 82     | 633   | 588           | 13 9 82  | 88.65         | 117.02  | 13 9 82       | 153.7   | 83.57  |          |       |       | 13 9 82      | 3.91   | 7.82  |
| 23 1 83     | 358   | 358           | 23 1 83  | 56.38         | 64.54   | 23 1 83       | 48.51   | 59.56  |          |       |       | 23 1 83      | 3.91   | 3.91  |
| 23 1 83     | 384   | 358           | 23 1 83  | 66.31         | 64.54   | 23 1 83       | 47.55   | 59.56  |          |       |       | 23 1 83      | 3.91   | 3.91  |
| 4 4 83      | 403   | 400           | 4 4 83   | 61.7          | 63.83   | 4 4 83        | 57.64   | 18.25  |          |       |       | 25 3 84      | 11.73  | 11.73 |
| 4 4 83      | 393   | 400           | 4 4 83   | 65.6          | 63.83   | 4 4 83        | 44.67   | 18.25  |          |       |       | 11 7 84      | 3.9    | 11.7  |
| 25 3 84     | 320   | 281           | 25 3 84  | 50.7          | 51.06   | 25 3 84       | 38.42   | 36.90  |          |       |       | 2 8 84       | 3.9    | 3.9   |
| 22 5 84     | 499   | 492           | 22 5 84  | 78.05         | 83.65   | 22 5 84       | 48      | 55.2   |          |       |       | TOTAL 101.54 | 158.92 |       |
| 2 6 84      | 820   | 531           | 2 6 84   | 94.5          | 90.3    | 2 6 84        | 71.04   | 68.64  |          |       |       | MEAN         | 4.62   | 7.22  |
| 11 7 84     | 518   | 921           | 11 7 84  | 96.25         | 231.15  | 11 7 84       | 63.84   | 171.36 |          |       |       | S.D.         | 1.79   | 2.56  |
| 2 8 84      | 512   | 531           | 2 8 84   | 89.6          | 106.05  | 2 8 84        | 38.4    | 48     |          |       |       | (N)          | 1.75   | 2.50  |
| TOTAL 11868 | 14206 | TOTAL 1905.47 | 2928.03  | TOTAL 1376.18 | 1994.88 | TOTAL 1376.18 | 1994.88 |        |          |       |       | CORR.        |        | 0.45  |
| MEAN        | 456   | 546           | MEAN     | 73.29         | 112.62  | MEAN          | 52.93   | 76.73  |          |       |       | CON. (A)     | (A)    | 4.22  |
| S.D.        | 113   | 155           | S.D.     | 18.04         | 47.67   | S.D.          | 27.04   | 38.20  |          |       |       | CON. (B)     | (B)    | 0.65  |
| (N)         | 110   | 152           | (N)      | 17.69         | 46.75   | (N)           | 26.51   | 37.45  |          |       |       |              |        |       |
| CORR.       |       | 0.47          | CORR.    |               | 0.56    | CORR.         |         | 0.41   |          |       |       |              |        |       |
| CON. (A)    | (A)   | 249.60        | CON. (A) | (A)           | 4.15    | CON. (A)      | (A)     | 46.03  |          |       |       |              |        |       |
| CON. (B)    | (B)   | 0.65          | CON. (B) | (B)           | 1.48    | CON. (B)      | (B)     | 0.58   |          |       |       |              |        |       |

Table 23. CORRELATION between — Yabis and Dier Alla (Dry season)

| DATE     | T.D.S     | T.D.S | DATE     | CI     | CI      | DATE     | SO4    | SO4    | DATE     | NH4  | NH4  | DATE     | K     | K     |
|----------|-----------|-------|----------|--------|---------|----------|--------|--------|----------|------|------|----------|-------|-------|
| 2 7 74   | 512       | 704   | 2 7 74   | 94.07  | 168.62  | 2 7 74   | 59.52  | 111.84 | 2 8 84   | 1    | 1    | 2 7 74   | 4.29  | 8.19  |
| 13 9 82  | 633       | 588   | 13 9 82  | 88.65  | 117.02  | 13 9 82  | 153.7  | 83.57  | TOTAL    | 1.00 | 1.00 | 13 9 82  | 3.91  | 7.82  |
| 2 6 84   | 820       | 531   | 2 6 84   | 94.5   | 90.3    | 2 6 84   | 71.04  | 68.64  | MEAN     | 1.00 | 1.00 | 11 7 84  | 3.9   | 11.7  |
| 11 7 84  | 518       | 921   | 11 7 84  | 96.25  | 231.15  | 11 7 84  | 63.84  | 171.36 | S.D.     | 0.00 | 0.00 | 2 8 84   | 3.9   | 3.9   |
| 2 8 84   | 512       | 531   | 2 8 84   | 89.6   | 106.05  | 2 8 84   | 38.4   | 48     | (H)      | 0.00 | 0.00 | TOTAL    | 16.00 | 31.61 |
| TOTAL    | 2995      | 3275  | TOTAL    | 463.07 | 713.14  | TOTAL    | 386.50 | 483.41 | CORR.    | 0.00 | 0.00 | MEAN     | 4.00  | 7.90  |
| MEAN     | 599       | 655   | MEAN     | 92.61  | 142.63  | MEAN     | 77.30  | 96.68  | CON. (A) | (A)  | 1.00 | S.D.     | 0.20  | 3.19  |
| S.D.     | 134       | 165   | S.D.     | 3.30   | 57.54   | S.D.     | 44.40  | 47.79  | CON. (B) | (B)  | 0.00 | (H)      | 0.17  | 2.76  |
| (H)      | 120       | 147   | (H)      | 2.96   | 51.47   | (H)      | 39.72  | 42.74  |          |      |      | CORR.    |       | 0.06  |
| CORR.    | -0.51     |       | CORR.    |        | 0.62    | CORR.    |        | -0.02  |          |      |      | CON. (A) | (A)   | 3.90  |
| CON. (A) | (A) ***** |       | CON. (A) | (A)    | -859.41 | CON. (A) | (A)    | 99.00  |          |      |      | CON. (B) | (B)   | 1.00  |
| CON. (B) | (B) -0.62 |       | CON. (B) | (B)    | 10.82   | CON. (B) | (B)    | -0.83  |          |      |      |          |       |       |

Table 24. CORRELATION between — Yabis and Dier Alla (Rain season)

| DATE     | T.D.S      | T.D.S | DATE     | CI      | CI      | DATE     | SO4    | SO4     | DATE     | NH4   | NH4   | DATE     | K     | K      |
|----------|------------|-------|----------|---------|---------|----------|--------|---------|----------|-------|-------|----------|-------|--------|
| 15 2 75  | 377        | 704   | 15 2 75  | 57.15   | 197.38  | 15 2 75  | 31.68  | 55.68   | 15 2 75  | 0.05  | 0.05  | 15 2 75  | 2.73  | 7.8    |
| 27 4 75  | 528        | 659   | 27 4 75  | 89.46   | 132.41  | 27 4 75  | 70.56  | 108.48  | 27 4 75  | 0.18  | 0.21  | 27 4 75  | 4.68  | 6.24   |
| 22 5 75  | 506        | 806   | 22 5 75  | 88.75   | 198.8   | 22 5 75  | 56.64  | 129.6   | 22 5 75  | 2.14  | 7.05  | 22 5 75  | 5.46  | 11.7   |
| 30 3 75  | 396        | 569   | 30 3 75  | 57.15   | 115.37  | 30 3 75  | 43.2   | 86.4    | 30 3 75  | 0.88  | 0.71  | 30 3 75  | 2.73  | 6.24   |
| 10 4 75  | 486        | 717   | 10 4 75  | 74.55   | 153.36  | 10 4 75  | 59.52  | 117.12  | 26 1 75  | 0.362 | 0.208 | 10 4 75  | 4.68  | 7.8    |
| 18 11 75 | 531        | 659   | 18 11 75 | 92.3    | 137.03  | 18 11 75 | 59.04  | 126.70  | 27 11 76 | 4.8   | 0.48  | 18 11 75 | 5.46  | 8.2    |
| 26 1 75  | 474        | 576   | 26 1 75  | 80.58   | 114.31  | 26 1 75  | 57.6   | 81.6    | 4 4 76   | 0.49  | 0.40  | 26 1 75  | 3.9   | 5.07   |
| 27 11 76 | 486        | 592   | 27 11 76 | 85.45   | 117.73  | 27 11 76 | 83.68  | 107.59  | 16 2 76  | 0.05  | 0.1   | 27 11 76 | 5.86  | 7.03   |
| 4 4 76   | 442        | 544   | 4 4 76   | 74.46   | 109.92  | 4 4 76   | 62.43  | 81.65   | TOTAL    | 8.95  | 9.21  | 4 4 76   | 5.47  | 7.82   |
| 16 2 76  | 314        | 486   | 16 2 76  | 48.58   | 91.84   | 16 2 76  | 42.27  | 75.88   | MEAN     | 1.12  | 1.15  | 16 2 76  | 3.91  | 6.64   |
| 31 3 79  | 486        | 582   | 31 3 79  | 92.19   | 127.65  | 31 3 79  | 59.97  | 98.46   | S.D.     | 1.64  | 2.39  | 31 3 79  | 5.08  | 8.21   |
| 13 2 79  | 480        | 595   | 13 2 79  | 83.33   | 125.88  | 13 2 79  | 36.94  | 67.24   | (H)      | 1.53  | 2.24  | 13 2 79  | 4.3   | 7.42   |
| 1 12 79  | 259        | 425   | 1 12 79  | 40.78   | 88.65   | 1 12 79  | 19.21  | 81.65   | CORR.    |       | 0.29  | 1 12 79  | 3.52  | 10.16  |
| 20 1 80  | 342        | 319   | 20 1 80  | 36.88   | 51.06   | 20 1 80  | 5.76   | 21.13   | CON. (A) | (A)   | 0.67  | 20 1 80  | 3.91  | 3.91   |
| 17 3 81  | 409        | 409   | 17 3 81  | 62.05   | 62.05   | 17 3 81  | 17.29  | 24.49   | CON. (B) | (B)   | 0.43  | 17 3 81  | 4.3   | 3.52   |
| 23 1 83  | 384        | 358   | 23 1 83  | 66.31   | 64.54   | 23 1 83  | 47.55  | 59.56   |          |       |       | 23 1 83  | 3.91  | 3.91   |
| 23 1 83  | 358        | 358   | 23 1 83  | 56.38   | 64.54   | 23 1 83  | 48.51  | 59.56   |          |       |       | 23 1 83  | 3.91  | 3.91   |
| 4 4 83   | 393        | 400   | 4 4 83   | 65.6    | 63.83   | 4 4 83   | 44.67  | 18.25   |          |       |       | 25 3 84  | 11.73 | 11.73  |
| 4 4 83   | 403        | 400   | 4 4 83   | 61.7    | 63.83   | 4 4 83   | 57.64  | 18.25   |          |       |       | TOTAL    | 85.54 | 127.31 |
| 22 5 84  | 499        | 492   | 22 5 84  | 78.05   | 83.65   | 22 5 84  | 48     | 55.2    |          |       |       | MEAN     | 4.75  | 7.07   |
| 25 3 84  | 320        | 281   | 25 3 84  | 50.7    | 51.06   | 25 3 84  | 38.42  | 36.98   |          |       |       | S.D.     | 1.96  | 2.49   |
| TOTAL    | 8873       | 10931 | TOTAL    | 1442.40 | 2214.89 | TOTAL    | 989.68 | 1511.47 |          |       |       | (H)      | 1.90  | 2.42   |
| MEAN     | 423        | 521   | MEAN     | 68.69   | 105.47  | MEAN     | 47.13  | 71.97   |          |       |       | CORR.    |       | 0.55   |
| S.D.     | 77         | 144   | S.D.     | 17.00   | 43.59   | S.D.     | 18.32  | 35.27   |          |       |       | CON. (A) | (A)   | 3.75   |
| (H)      | 75         | 141   | (H)      | 16.59   | 42.54   | (H)      | 17.88  | 34.42   |          |       |       | CON. (B) | (B)   | 0.70   |
| CORR.    | 0.70       |       | CORR.    |         | 0.54    | CORR.    |        | 0.60    |          |       |       |          |       |        |
| CON. (A) | (A) -24.67 |       | CON. (A) | (A)     | 10.68   | CON. (A) | (A)    | 17.30   |          |       |       |          |       |        |
| CON. (B) | (B) 1.29   |       | CON. (B) | (B)     | 1.38    | CON. (B) | (B)    | 1.16    |          |       |       |          |       |        |

Table 25. CORRELATION between – Yabis and Dier Alla (Whole season)

| DATE     | Ca      | Ca      | DATE     | Hg     | Hg     | DATE     | Na      | Na      | DATE     | Ca+Hg/Na+K | Ca+Hg/Na+K |
|----------|---------|---------|----------|--------|--------|----------|---------|---------|----------|------------|------------|
| 2 7 74   | 53.8    | 62      | 2 7 74   | 30.66  | 42.31  | 2 7 74   | 62.1    | 97.75   | 2 7 74   | 1.27       | 0.98       |
| 26 1 75  | 47.2    | 58      | 26 1 75  | 27.23  | 31.61  | 26 1 75  | 63.25   | 82.8    | 26 1 75  | 1.11       | 1.02       |
| 15 2 75  | 38.4    | 57.2    | 15 2 75  | 21.03  | 37.33  | 15 2 75  | 51.75   | 111.55  | 15 2 75  | 1.09       | 0.79       |
| 30 3 75  | 40      | 53      | 30 3 75  | 21.38  | 31.61  | 30 3 75  | 51.75   | 78.2    | 30 3 75  | 1.14       | 1.00       |
| 10 4 75  | 52      | 70      | 10 4 75  | 27.23  | 38.18  | 10 4 75  | 63.25   | 101.2   | 10 4 75  | 1.17       | 0.99       |
| 27 4 75  | 52.4    | 63.4    | 27 4 75  | 26.99  | 31.49  | 27 4 75  | 51.75   | 92      | 27 4 75  | 1.41       | 0.97       |
| 22 5 75  | 52      | 68      | 22 5 75  | 27.22  | 42.56  | 22 5 75  | 70.15   | 124.2   | 22 5 75  | 1.05       | 0.81       |
| 18 11 75 | 51.6    | 74.8    | 18 11 75 | 24.7   | 32.2   | 18 11 75 | 82.8    | 90.8    | 18 11 75 | 0.86       | 1.08       |
| 16 2 76  | 32.86   | 48.09   | 16 2 76  | 14.59  | 53.59  | 16 2 76  | 45.98   | 71.26   | 16 2 76  | 0.95       | 1.31       |
| 4 4 76   | 43.28   | 50.9    | 4 4 76   | 22.37  | 31.12  | 4 4 76   | 65.52   | 74.32   | 4 4 76   | 0.92       | 1.00       |
| 27 11 76 | 46.89   | 56.11   | 27 11 76 | 24.56  | 30.4   | 27 11 76 | 70.11   | 89.66   | 27 11 76 | 0.94       | 0.89       |
| 13 2 79  | 45.09   | 45.09   | 13 2 79  | 21.23  | 26.99  | 13 2 79  | 75.86   | 105.75  | 13 2 79  | 0.83       | 0.64       |
| 31 3 79  | 47.29   | 55.51   | 31 3 79  | 28.08  | 33.07  | 31 3 79  | 72.4    | 97.7    | 31 3 79  | 0.97       | 0.84       |
| 1 12 79  | 36.07   | 58.71   | 1 12 79  | 0.24   | 15.44  | 1 12 79  | 33.34   | 59.77   | 1 12 79  | 0.99       | 1.06       |
| 20 1 80  | 51.91   | 36.67   | 20 1 80  | 21.77  | 13.98  | 20 1 80  | 20.69   | 45.98   | 20 1 80  | 3.00       | 1.02       |
| 17 3 81  | 48.69   | 49.29   | 17 3 81  | 18.96  | 18.24  | 17 3 81  | 46.44   | 48.5    | 17 3 81  | 1.33       | 1.30       |
| 13 9 82  | 56.11   | 67.33   | 13 9 82  | 53.5   | 27.24  | 13 9 82  | 71.27   | 82.76   | 13 9 82  | 1.46       | 1.04       |
| 23 1 83  | 48.9    | 52.91   | 23 1 83  | 19.7   | 17.02  | 23 1 83  | 45.7    | 43.68   | 23 1 83  | 1.38       | 1.47       |
| 23 1 83  | 47.9    | 52.91   | 23 1 83  | 16.54  | 17.02  | 23 1 83  | 59.77   | 43.68   | 23 1 83  | 1.01       | 1.47       |
| 4 4 83   | 46.49   | 48.1    | 4 4 83   | 20.67  | 19.21  | 4 4 83   | 55.18   | 52.88   | 25 3 84  | 0.81       | 1.07       |
| 4 4 83   | 45.69   | 48.1    | 4 4 83   | 19.94  | 19.21  | 4 4 83   | 52.88   | 52.88   | 11 7 84  | 0.98       | 0.92       |
| 25 3 84  | 32.86   | 36.67   | 25 3 84  | 13.62  | 12.88  | 25 3 84  | 45.98   | 34.48   | 2 8 84   | 1.84       | 0.97       |
| 22 5 84  | 50.06   | 47.2    | 22 5 84  | 25.92  | 25.92  | 22 5 84  | 66.07   | 71.3    | TOTAL    | 26.51      | 22.64      |
| 2 6 84   | 53      | 51      | 2 6 84   | 23.4   | 26.4   | 2 6 84   | 80.5    | 75.9    | MEAN     | 1.21       | 1.03       |
| 11 7 84  | 47.6    | 89.6    | 11 7 84  | 28.44  | 43.91  | 11 7 84  | 73.6    | 133.4   | S.D.     | 0.47       | 0.20       |
| 2 8 84   | 55      | 75.4    | 2 8 84   | 83.64  | 10.8   | 2 8 84   | 71.3    | 85.1    | (H)      | 0.46       | 0.20       |
| TOTAL    | 1223.09 | 1475.99 | TOTAL    | 664.11 | 729.73 | TOTAL    | 1549.39 | 2047.50 | CORR.    |            | 0.11       |
| MEAN     | 47.04   | 56.77   | MEAN     | 25.54  | 28.07  | MEAN     | 59.59   | 78.75   | CON. (A) | (A)        | 0.98       |
| S.D.     | 6.43    | 12.12   | S.D.     | 14.71  | 10.94  | S.D.     | 14.69   | 25.95   | CON. (B) | (B)        | 0.04       |
| (H)      | 6.30    | 11.88   | (H)      | 14.42  | 10.72  | (H)      | 14.40   | 25.45   |          |            |            |
| CORR.    |         | 0.42    | CORR.    |        | -0.08  | CORR.    |         | 0.60    |          |            |            |
| CON. (A) | (A)     | 19.14   | CON. (A) | (A)    | 29.68  | CON. (A) | (A)     | 15.58   |          |            |            |
| CON. (B) | (B)     | 0.80    | CON. (B) | (B)    | -0.06  | CON. (B) | (B)     | 1.06    |          |            |            |

Table 26. CORRELATION between – Yabis and Dier Alla (Dry season)

| DATE     | Ca     | Ca     | DATE     | Hg     | Hg     | DATE     | Na     | Na     | DATE     | Ca+Hg/Na+K | Ca+Hg/Na+K |
|----------|--------|--------|----------|--------|--------|----------|--------|--------|----------|------------|------------|
| 2 7 74   | 53.8   | 62     | 2 7 74   | 30.66  | 42.31  | 2 7 74   | 62.1   | 97.75  | 2 7 74   | 1.27       | 0.98       |
| 13 9 82  | 56.11  | 67.33  | 13 9 82  | 53.5   | 27.24  | 13 9 82  | 71.27  | 82.76  | 13 9 82  | 1.46       | 1.04       |
| 2 6 84   | 53     | 51     | 2 6 84   | 23.4   | 26.4   | 2 6 84   | 80.5   | 75.9   | 11 7 84  | 0.98       | 0.92       |
| 11 7 84  | 47.6   | 89.6   | 11 7 84  | 28.44  | 43.91  | 11 7 84  | 73.6   | 133.4  | 2 8 84   | 1.84       | 0.97       |
| 2 8 84   | 55     | 75.4   | 2 8 84   | 83.64  | 10.8   | 2 8 84   | 71.3   | 85.1   | TOTAL    | 5.55       | 3.91       |
| TOTAL    | 265.51 | 345.33 | TOTAL    | 219.64 | 150.66 | TOTAL    | 358.77 | 474.91 | MEAN     | 1.39       | 0.98       |
| MEAN     | 53.10  | 69.07  | MEAN     | 43.93  | 30.13  | MEAN     | 71.75  | 94.98  | S.D.     | 0.36       | 0.00       |
| S.D.     | 3.30   | 14.50  | S.D.     | 25.03  | 13.55  | S.D.     | 6.59   | 22.88  | (H)      | 0.32       | 0.00       |
| (H)      | 2.95   | 12.97  | (H)      | 22.39  | 12.12  | (H)      | 5.89   | 20.47  | CORR.    |            | 0.00       |
| CORR.    |        | -0.57  | CORR.    |        | -0.81  | CORR.    |        | -0.19  | CON. (A) | (A)        | 0.91       |
| CON. (A) | (A)    | 202.88 | CON. (A) | (A)    | 49.46  | CON. (A) | (A)    | 141.62 | CON. (B) | (B)        | 0.05       |
| CON. (B) | (B)    | -2.52  | CON. (B) | (B)    | -0.44  | CON. (B) | (B)    | -0.65  |          |            |            |

Table 27. CORRELATION between — Yabis and Dier Alla (Rain season)

| DATE     | Ca      | Ca     | DATE     | Hg     | Hg     | DATE     | Na      | Na      | DATE     | Ca/Hg/Na/K | Ca/Hg/Na/K |
|----------|---------|--------|----------|--------|--------|----------|---------|---------|----------|------------|------------|
| 15 2 75  | 38.4    | 57.2   | 15 2 75  | 21.83  | 37.33  | 15 2 75  | 51.75   | 111.55  | 15 2 75  | 1.09       | 0.79       |
| 27 4 75  | 52.4    | 63.4   | 27 4 75  | 26.99  | 31.49  | 27 4 75  | 51.75   | 92      | 27 4 75  | 1.41       | 0.97       |
| 22 5 75  | 52      | 68     | 22 5 75  | 27.22  | 42.56  | 22 5 75  | 70.15   | 124.2   | 22 5 75  | 1.05       | 0.81       |
| 30 3 75  | 40      | 53     | 30 3 75  | 21.88  | 31.61  | 30 3 75  | 51.75   | 78.2    | 30 3 75  | 1.14       | 1.00       |
| 10 4 75  | 52      | 70     | 10 4 75  | 27.23  | 38.18  | 10 4 75  | 63.25   | 101.2   | 10 4 75  | 1.17       | 0.99       |
| 18 11 75 | 51.6    | 74.8   | 18 11 75 | 24.7   | 32.2   | 18 11 75 | 82.8    | 90.8    | 18 11 75 | 0.86       | 1.08       |
| 26 1 75  | 47.2    | 58     | 26 1 75  | 27.23  | 31.61  | 26 1 75  | 63.25   | 82.8    | 26 1 75  | 1.11       | 1.02       |
| 27 11 76 | 46.89   | 56.11  | 27 11 76 | 24.56  | 30.4   | 27 11 76 | 70.11   | 89.66   | 27 11 76 | 0.94       | 0.89       |
| 4 4 76   | 43.28   | 50.9   | 4 4 76   | 22.37  | 31.12  | 4 4 76   | 65.52   | 74.32   | 4 4 76   | 0.92       | 1.00       |
| 16 2 76  | 32.86   | 48.09  | 16 2 76  | 14.59  | 53.59  | 16 2 76  | 45.98   | 71.26   | 16 2 76  | 0.95       | 1.31       |
| 31 3 79  | 47.29   | 55.51  | 31 3 79  | 28.08  | 33.07  | 31 3 79  | 72.4    | 97.7    | 31 3 79  | 0.97       | 0.84       |
| 13 2 79  | 45.09   | 45.09  | 13 2 79  | 21.23  | 26.99  | 13 2 79  | 75.86   | 105.75  | 13 2 79  | 0.83       | 0.64       |
| 1 12 79  | 36.07   | 58.71  | 1 12 79  | 0.24   | 15.44  | 1 12 79  | 33.34   | 59.77   | 1 12 79  | 0.99       | 1.06       |
| 20 1 80  | 51.91   | 36.67  | 20 1 80  | 21.77  | 13.98  | 20 1 80  | 20.69   | 45.98   | 20 1 80  | 3.00       | 1.02       |
| 17 3 81  | 48.69   | 49.29  | 17 3 81  | 18.96  | 18.24  | 17 3 81  | 46.44   | 48.5    | 17 3 81  | 1.33       | 1.30       |
| 23 1 83  | 47.9    | 52.91  | 23 1 83  | 16.54  | 17.02  | 23 1 83  | 59.77   | 43.68   | 23 1 83  | 1.01       | 1.47       |
| 23 1 83  | 48.9    | 52.91  | 23 1 83  | 19.7   | 17.02  | 23 1 83  | 45.7    | 43.68   | 23 1 83  | 1.38       | 1.47       |
| 4 4 83   | 45.69   | 48.1   | 4 4 83   | 19.94  | 19.21  | 4 4 83   | 52.88   | 52.88   | 25 3 84  | 0.81       | 1.07       |
| 4 4 83   | 46.49   | 48.1   | 4 4 83   | 20.67  | 19.21  | 4 4 83   | 55.18   | 52.88   | TOTAL    | 20.96      | 18.73      |
| 22 5 84  | 50.06   | 47.2   | 22 5 84  | 25.92  | 25.92  | 22 5 84  | 66.07   | 71.3    | MEAN     | 1.16       | 1.04       |
| 25 3 84  | 32.86   | 36.67  | 25 3 84  | 13.62  | 12.88  | 25 3 84  | 45.98   | 34.48   | S.D.     | 0.49       | 0.22       |
| TOTAL    | 957.581 | 130.66 | TOTAL    | 444.47 | 579.07 | TOTAL    | 1190.62 | 1572.59 | (M)      | 0.48       | 0.22       |
| MEAN     | 45.60   | 53.84  | MEAN     | 21.17  | 27.57  | MEAN     | 56.70   | 74.89   | CORR.    |            | 0.09       |
| S.D.     | 6.17    | 9.73   | S.D.     | 6.36   | 10.56  | S.D.     | 14.67   | 25.61   | CON. (A) | (A)        | 0.98       |
| (M)      | 6.02    | 9.50   | (M)      | 6.21   | 10.30  | (M)      | 14.32   | 24.99   | CON. (B) | (B)        | 0.05       |
| CORR.    |         | 0.39   | CORR.    |        | 0.41   | CORR.    |         | 0.62    |          |            |            |
| CON. (A) | (A)     | 25.57  | CON. (A) | (A)    | 13.17  | CON. (A) | (A)     | 13.65   |          |            |            |
| CON. (B) | (B)     | 0.62   | CON. (B) | (B)    | 0.68   | CON. (B) | (B)     | 1.08    |          |            |            |

Table 28. CORRELATION between — Yabis and Dier Alla (Whole season)

| DATE     | Cl/SO4 | Cl/SO4 | DATE     | CO3    | CO3    | DATE     | HCO3    | HCO3    | DATE     | NO3    | NO3    |
|----------|--------|--------|----------|--------|--------|----------|---------|---------|----------|--------|--------|
| 2 7 74   | 1.58   | 1.51   | 2 7 74   | 6      | 9      | 2 7 74   | 229.36  | 213.5   | 2 7 74   | 6.63   | 12.26  |
| 26 1 75  | 1.40   | 1.40   | 26 1 75  | 5.4    | 10.8   | 26 1 75  | 237.29  | 228.14  | 26 1 75  | 9.61   | 11.82  |
| 15 2 75  | 1.80   | 3.54   | 15 2 75  | 9.6    | 7.2    | 15 2 75  | 189.1   | 221.43  | 15 2 75  | 11.6   | 11.52  |
| 30 3 75  | 1.32   | 1.34   | 30 3 75  | 11.1   | 10.2   | 30 3 75  | 190.32  | 197.03  | 30 3 75  | 7.53   | 8.59   |
| 10 4 75  | 1.25   | 1.31   | 10 4 75  | 9      | 15.3   | 10 4 75  | 239.12  | 228.14  | 10 4 75  | 10.63  | 11.51  |
| 27 4 75  | 1.27   | 1.22   | 27 4 75  | 17.1   | 11.4   | 27 4 75  | 207.4   | 229.36  | 27 4 75  | 14.04  | 14.49  |
| 22 5 75  | 1.57   | 1.53   | 18 11 75 | 9.6    | 14.4   | 22 5 75  | 254.98  | 223.26  | 22 5 75  | 12.49  | 10.19  |
| 18 11 75 | 1.56   | 1.08   | 4 4 76   | 9.47   | 9.47   | 18 11 75 | 226.9   | 208.6   | 18 11 75 | 14.53  | 16.39  |
| 16 2 76  | 1.15   | 1.21   | 13 2 79  | 12.83  | 15.27  | 16 2 76  | 162.29  | 215.37  | 16 2 76  | 17.53  | 10.63  |
| 4 4 76   | 1.19   | 1.35   | 31 3 79  | 15.88  | 4.88   | 4 4 76   | 202.55  | 209.26  | 4 4 76   | 10.63  | 18.27  |
| 27 11 76 | 1.02   | 1.09   | 17 3 81  | 10.99  | 9.78   | 27 11 76 | 198.89  | 231.84  | 27 11 76 | 11.6   | 11.07  |
| 13 2 79  | 2.26   | 1.87   | 23 1 83  | 5.8    | 3.67   | 13 2 79  | 224.51  | 225.73  | 13 2 79  | 11.95  | 12.18  |
| 31 3 79  | 1.56   | 1.30   | 23 1 83  | 5.19   | 3.67   | 31 3 79  | 111.67  | 234.27  | 31 3 79  | 11.07  | 9.74   |
| 1 12 79  | 2.12   | 1.09   | 4 4 83   | 3.67   | 6.11   | 1 12 79  | 135.44  | 158.63  | 1 12 79  | 17.2   | 17.28  |
| 20 1 80  | 6.40   | 2.42   | 22 5 84  | 11.04  | 15     | 20 1 80  | 222.08  | 160.46  | 20 1 80  | 33.8   | 21.26  |
| 17 3 81  | 3.59   | 2.53   | 2 6 84   | 3.6    | 15.6   | 17 3 81  | 200.72  | 202.55  | 17 3 81  | 23.9   | 22.24  |
| 13 9 82  | 0.58   | 1.40   | 11 7 84  | 16.5   | 13.2   | 13 9 82  | 272.1   | 263.56  | 13 9 82  | 8.8    | 9.26   |
| 23 1 83  | 1.16   | 1.08   | 2 8 84   | 2.4    | 4.5    | 23 1 83  | 199.5   | 161.68  | 23 1 83  | 13.1   | 14.13  |
| 23 1 83  | 1.39   | 1.08   | TOTAL    | 165.17 | 179.45 | 23 1 83  | 189.74  | 161.68  | 23 1 83  | 12.1   | 14.13  |
| 4 4 83   | 1.07   | 3.50   | MEAN     | 9.18   | 9.97   | 4 4 83   | 198.89  | 208.65  | 4 4 83   | 10.9   | 34.19  |
| 4 4 83   | 1.47   | 3.50   | S.D.     | 4.50   | 4.24   | 4 4 83   | 204.99  | 208.65  | 4 4 83   | 10     | 34.19  |
| 25 3 84  | 1.32   | 1.38   | (M)      | 4.38   | 4.12   | 25 3 84  | 142.76  | 151.3   | 25 3 84  | 7.7    | 9.57   |
| 22 5 84  | 1.63   | 1.52   | CORR.    |        | 0.32   | 22 5 84  | 230.58  | 217.77  | 22 5 84  | 11     | 9.5    |
| 2 6 81   | 1.33   | 1.32   | CON. (A) | (A)    | 7.22   | 2 6 84   | 222.65  | 206.18  | 2 6 84   | 10.8   | 9.6    |
| 11 7 84  | 1.51   | 1.35   | CON. (B) | (B)    | 0.30   | 11 7 84  | 203.13  | 237.7   | 11 7 84  | 9.2    | 23.2   |
| 2 8 84   | 2.33   | 2.21   |          |        |        | 2 8 84   | 264.74  | 262.3   | 2 8 84   | 8.3    | 10     |
| TOTAL    | 44.83  | 44.13  |          |        |        | TOTAL    | 5361.70 | 5467.04 | TOTAL    | 326.64 | 387.21 |
| MEAN     | 1.72   | 1.70   |          |        |        | MEAN     | 206.22  | 210.27  | MEAN     | 12.56  | 14.89  |
| S.D.     | 1.11   | 0.77   |          |        |        | S.D.     | 37.70   | 30.05   | S.D.     | 5.64   | 7.04   |
| (M)      | 1.09   | 0.75   |          |        |        | (M)      | 36.97   | 29.47   | (M)      | 5.53   | 6.90   |
| CORR.    |        | 0.32   |          |        |        | CORR.    |         | 0.49    | CORR.    |        | 0.26   |
| CON. (A) | (A)    | 1.32   |          |        |        | CON. (A) | (A)     | 129.84  | CON. (A) | (A)    | 10.75  |
| CON. (B) | (B)    | 0.22   |          |        |        | CON. (B) | (B)     | 0.39    | CON. (B) | (B)    | 0.33   |

Table 29. CORRELATION between — Yabis and Dier Alla (Dry season)

| DATE     | CI/SO4 | CI/SO4 | DATE     | CO3   | CO3   | DATE     | HC03    | HC03    | DATE     | NO3   | NO3   |
|----------|--------|--------|----------|-------|-------|----------|---------|---------|----------|-------|-------|
| 2 7 74   | 1.58   | 1.51   | 2 7 74   | 6     | 9     | 2 7 74   | 229.36  | 213.5   | 2 7 74   | 6.63  | 12.26 |
| 13 9 82  | 0.58   | 1.40   | 2 6 84   | 3.6   | 15.6  | 13 9 82  | 272.1   | 263.56  | 13 9 82  | 8.8   | 9.26  |
| 2 6 84   | 1.33   | 1.32   | 11 7 84  | 16.5  | 13.2  | 2 6 84   | 222.65  | 206.18  | 2 6 84   | 10.8  | 9.6   |
| 11 7 84  | 1.51   | 1.35   | 2 8 84   | 2.4   | 4.5   | 11 7 84  | 293.13  | 237.7   | 11 7 84  | 9.2   | 23.2  |
| 2 8 84   | 2.33   | 2.21   | TOTAL    | 28.50 | 42.30 | 2 8 84   | 264.74  | 262.3   | 2 8 84   | 8.3   | 10    |
| TOTAL    | 7.33   | 7.79   | MEAN     | 7.13  | 10.58 | TOTAL    | 1191.98 | 1183.24 | TOTAL    | 43.73 | 64.32 |
| MEAN     | 1.47   | 1.56   | S.D.     | 6.43  | 4.88  | MEAN     | 238.40  | 236.65  | MEAN     | 8.75  | 12.86 |
| S.D.     | 0.62   | 0.37   | (H)      | 5.57  | 4.23  | S.D.     | 29.17   | 26.68   | S.D.     | 1.51  | 5.90  |
| (H)      | 0.56   | 0.33   | CORR.    |       | 0.40  | (H)      | 26.09   | 23.86   | (H)      | 1.35  | 5.27  |
| CORR.    |        | 0.78   | CON. (A) | (A)   | 8.44  | CORR.    |         | 0.72    | CORR.    |       | 0.01  |
| CON. (A) | (A)    | 0.88   | CON. (B) | (B)   | 0.30  | CON. (A) | (A)     | 79.31   | CON. (A) | (A)   | 12.51 |
| CON. (B) | (B)    | 0.46   |          |       |       | CON. (B) | (B)     | 0.66    | CON. (B) | (B)   | 0.04  |

Table 30. CORRELATION between — Yabis and Dier Alla (Rain season)

| DATE     | CI/SO4 | CI/SO4 | DATE     | CO3    | CO3    | DATE     | HC03    | HC03    | DATE     | NO3    | NO3    |
|----------|--------|--------|----------|--------|--------|----------|---------|---------|----------|--------|--------|
| 15 2 75  | 1.80   | 3.54   | 15 2 75  | 9.6    | 7.2    | 15 2 75  | 189.1   | 221.43  | 15 2 75  | 11.6   | 11.52  |
| 27 4 75  | 1.27   | 1.22   | 27 4 75  | 17.1   | 11.4   | 27 4 75  | 207.4   | 229.36  | 27 4 75  | 14.04  | 14.49  |
| 22 5 75  | 1.57   | 1.53   | 30 3 75  | 11.1   | 10.2   | 22 5 75  | 254.98  | 223.26  | 22 5 75  | 12.49  | 10.19  |
| 30 3 75  | 1.32   | 1.34   | 10 4 75  | 9      | 15.3   | 30 3 75  | 190.32  | 197.03  | 30 3 75  | 7.53   | 8.59   |
| 10 4 75  | 1.25   | 1.31   | 18 11 75 | 9.6    | 14.4   | 10 4 75  | 239.12  | 228.14  | 10 4 75  | 10.63  | 11.51  |
| 18 11 75 | 1.56   | 1.08   | 26 1 75  | 5.4    | 10.8   | 18 11 75 | 226.9   | 208.6   | 18 11 75 | 14.53  | 16.39  |
| 26 1 75  | 1.40   | 1.40   | 4 4 76   | 9.47   | 9.47   | 26 1 75  | 237.29  | 228.14  | 26 1 75  | 9.61   | 11.82  |
| 27 11 76 | 1.02   | 1.09   | 31 3 79  | 15.88  | 4.88   | 27 11 76 | 198.89  | 231.84  | 27 11 76 | 11.6   | 11.07  |
| 4 4 76   | 1.19   | 1.35   | 13 2 79  | 12.83  | 15.27  | 4 4 76   | 202.55  | 209.26  | 4 4 76   | 10.63  | 18.27  |
| 16 2 76  | 1.15   | 1.21   | 17 3 81  | 10.99  | 9.78   | 16 2 76  | 162.29  | 215.37  | 16 2 76  | 17.53  | 10.63  |
| 31 3 79  | 1.56   | 1.30   | 23 1 83  | 5.19   | 3.67   | 31 3 79  | 111.67  | 234.27  | 31 3 79  | 11.07  | 9.74   |
| 13 2 79  | 2.26   | 1.87   | 23 1 83  | 5.8    | 3.67   | 13 2 79  | 224.51  | 225.73  | 13 2 79  | 11.95  | 12.18  |
| 1 12 79  | 2.12   | 1.09   | 4 4 83   | 3.67   | 6.11   | 1 12 79  | 135.44  | 158.63  | 1 12 79  | 17.2   | 17.28  |
| 20 1 80  | 6.40   | 2.42   | 22 5 84  | 11.04  | 15     | 20 1 80  | 222.08  | 160.46  | 20 1 80  | 33.8   | 21.26  |
| 17 3 81  | 3.59   | 2.53   | TOTAL    | 136.67 | 137.15 | 17 3 81  | 200.72  | 202.55  | 17 3 81  | 23.9   | 22.24  |
| 23 1 83  | 1.39   | 1.08   | MEAN     | 9.76   | 9.80   | 23 1 83  | 189.74  | 161.68  | 23 1 83  | 12.1   | 14.13  |
| 23 1 83  | 1.16   | 1.08   | S.D.     | 3.91   | 4.22   | 23 1 83  | 199.5   | 161.68  | 23 1 83  | 13.1   | 14.13  |
| 4 4 83   | 1.47   | 3.50   | (H)      | 3.77   | 4.07   | 4 4 83   | 204.99  | 208.65  | 4 4 83   | 10     | 34.19  |
| 4 4 83   | 1.07   | 3.50   | CORR.    |        | 0.33   | 4 4 83   | 198.89  | 208.65  | 4 4 83   | 10.9   | 34.19  |
| 22 5 84  | 1.63   | 1.52   | CON. (A) | (A)    | 6.29   | 22 5 84  | 230.58  | 217.77  | 22 5 84  | 11     | 9.3    |
| 25 3 84  | 1.32   | 1.38   | CON. (B) | (B)    | 0.36   | 25 3 84  | 142.76  | 151.3   | 25 3 84  | 7.7    | 9.57   |
| TOTAL    | 37.50  | 36.34  |          |        |        | TOTAL    | 4169.72 | 4283.80 | TOTAL    | 282.91 | 322.89 |
| MEAN     | 1.79   | 1.73   |          |        |        | MEAN     | 198.56  | 203.99  | MEAN     | 13.47  | 15.38  |
| S.D.     | 1.20   | 0.84   |          |        |        | S.D.     | 35.86   | 27.77   | S.D.     | 5.90   | 7.33   |
| (H)      | 1.17   | 0.82   |          |        |        | (H)      | 35.00   | 27.10   | (H)      | 5.76   | 7.15   |
| CORR.    |        | 0.28   |          |        |        | CORR.    |         | 0.32    | CORR.    |        | 0.24   |
| CON. (A) | (A)    | 1.37   |          |        |        | CON. (A) | (A)     | 154.35  | CON. (A) | (A)    | 11.34  |
| CON. (B) | (B)    | 0.20   |          |        |        | CON. (B) | (B)     | 0.25    | CON. (B) | (B)    | 0.30   |



Table 31. CORRELATION between - Maqaren and Dier Alla (Whole season)

| DATE     | TDS110 | IDS110 | DATE     | KMnO4  | KMnO4  | DATE     | SO4    | SO4    | DATE     | NH3  | NH3   | DATE     | K     | K     | DATE     | CI     | CI     |
|----------|--------|--------|----------|--------|--------|----------|--------|--------|----------|------|-------|----------|-------|-------|----------|--------|--------|
| 30 6 79  | 465    | 554    | 30 6 79  | 5.50   | 8.70   | 30 6 79  | 86.4   | 65.0   | 30 6 79  | 0.10 | 0.26  | 12 8 79  | 4.8   | 6.1   | 30 6 79  | 85.2   | 128.7  |
| 12 8 79  | 498    | 532    | 12 8 79  | 3.50   | 4.80   | 1 10 79  | 64.2   | 78.6   | 12 8 79  | 0.10 | 0.12  | 11 11 79 | 4.8   | 6.1   | 12 8 79  | 84.8   | 98.9   |
| 1 10 79  | 439    | 565    | 11 11 79 | 11.30  | 9.70   | 11 11 79 | 59.7   | 69.1   | 1 10 79  | 0.52 | 0.96  | 20 1 80  | 4.6   | 5.2   | 1 10 79  | 84.8   | 109.5  |
| 11 11 79 | 452    | 518    | 20 1 80  | 13.30  | 6.50   | 20 1 80  | 30.9   | 50.6   | 11 11 79 | 0.32 | 0.52  | 3 2 80   | 5.7   | 12.4  | 11 11 79 | 79.1   | 94.9   |
| 20 1 80  | 378    | 447    | 3 2 80   | 10.00  | 11.40  | 3 2 80   | 56.8   | 141.2  | 20 1 80  | 0.40 | 0.24  | 9 3 80   | 4.6   | 4.2   | 20 1 80  | 58.0   | 100.2  |
| 3 2 80   | 502    | 885    | 9 3 80   | 16.30  | 24.00  | 9 3 80   | 23.1   | 35.8   | 3 2 80   | 0.34 | 0.34  | 1 4 80   | 5.0   | 5.3   | 3 2 80   | 73.8   | 128.0  |
| 9 3 80   | 263    | 378    | 1 4 80   | 8.70   | 11.50  | 1 4 80   | 50.6   | 47.3   | 9 3 80   | 0.56 | 0.40  | 5 5 80   | 4.9   | 5.6   | 9 3 80   | 38.1   | 38.1   |
| 1 4 80   | 446    | 548    | 5 5 80   | 6.64   | 7.58   | 5 5 80   | 70.0   | 73.7   | 1 4 80   | 0.20 | 0.36  | 1 6 80   | 1.8   | 1.8   | 1 4 80   | 69.9   | 78.3   |
| 5 5 80   | 441    | 430    | 1 6 80   | 9.20   | 12.60  | 1 6 80   | 55.5   | 65.8   | 5 5 80   | 0.40 | 0.48  | 1 8 80   | 4.7   | 7.6   | 5 5 80   | 83.3   | 89.1   |
| 1 6 80   | 503    | 486    | 1 8 80   | 2.99   | 8.44   | 8 7 80   | 64.2   | 116.9  | 1 6 80   | 0.20 | 0.20  | 1 9 80   | 4.7   | 5.9   | 1 6 80   | 92.2   | 88.7   |
| 8 7 80   | 470    | 571    | 1 9 80   | 11.00  | 9.90   | 1 8 80   | 69.5   | 73.6   | 8 7 80   | 0.20 | 0.96  | 15 10 80 | 5.0   | 5.8   | 8 7 80   | 97.4   | 132.2  |
| 1 8 80   | 617    | 633    | 24 12 80 | 0.60   | 3.30   | 1 9 80   | 75.3   | 69.9   | 1 8 80   | 0.09 | 0.52  | 11 11 80 | 5.3   | 5.2   | 1 8 80   | 86.1   | 99.9   |
| 1 9 80   | 686    | 604    | 7 1 81   | 15.63  | 22.04  | 15 10 80 | 70.9   | 76.5   | 1 9 80   | 0.12 | 0.14  | 24 12 80 | 6.3   | 6.3   | 1 9 80   | 88.8   | 101.8  |
| 15 10 80 | 491    | 506    | 8 2 81   | 6.82   | 8.06   | 11 11 80 | 71.2   | 77.8   | 15 10 80 | 0.20 | 0.20  | 7 1 81   | 6.8   | 10.8  | 15 10 80 | 88.3   | 93.6   |
| 11 11 80 | 623    | 625    | 10 3 81  | 14.32  | 15.44  | 24 12 80 | 60.5   | 58.8   | 11 11 80 | 0.16 | 0.20  | 8 2 81   | 6.0   | 6.5   | 11 11 80 | 104.4  | 95.7   |
| 24 12 80 | 326    | 311    | 12 4 81  | 69.52  | 69.52  | 7 1 81   | 52.6   | 26.4   | 7 1 81   | 0.72 | 1.80  | 10 3 81  | 6.4   | 6.9   | 7 1 81   | 69.6   | 25.5   |
| 7 1 81   | 419    | 238    | 17 5 81  | 11.22  | 6.79   | 8 2 81   | 35.4   | 28.8   | 8 2 81   | 0.24 | 0.26  | 12 4 81  | 6.2   | 4.8   | 8 2 81   | 67.0   | 127.0  |
| 8 2 81   | 326    | 344    | 1 8 81   | 10.70  | 12.50  | 10 3 81  | 42.8   | 42.0   | 10 3 81  | 0.24 | 0.16  | 17 5 81  | 6.0   | 5.2   | 12 4 81  | 83.3   | 85.1   |
| 10 3 81  | 369    | 400    | 28 9 81  | 7.60   | 7.00   | 12 4 81  | 48.2   | 49.4   | 1 8 81   | 0.06 | 0.06  | 1 8 81   | 18.0  | 20.0  | 17 5 81  | 115.3  | 83.3   |
| 12 4 81  | 572    | 580    | TOTAL    | 234.84 | 259.77 | 17 5 81  | 95.9   | 86.0   | TOTAL    | 5.17 | 8.18  | 28 9 81  | 10.0  | 8.5   | 1 8 81   | 106.5  | 142.0  |
| 17 5 81  | 685    | 679    | MEAN     | 12.36  | 13.67  | 1 8 81   | 82.0   | 95.0   | MEAN     | 0.27 | 0.43  | TOTAL    | 121.6 | 140.2 | 28 9 81  | 110.0  | 103.0  |
| 1 8 81   | 499    | 499    | S.D.     | 14.48  | 14.51  | TOTAL    | 1264.8 | 1430.2 | S.D.     | 0.17 | 0.41  | MEAN     | 6.1   | 7.0   | TOTAL    | 1765.9 | 2043.5 |
| 28 9 81  | 551    | 577    | (H)      | 14.09  | 14.13  | MEAN     | 60.2   | 68.1   | (H)      | 0.17 | 0.40  | S.D.     | 3.2   | 3.8   | MEAN     | 84.1   | 97.3   |
| TOTAL    | 10835  | 11909  | CORR.    |        | 0.97   | S.D.     | 18.1   | 27.5   | CORR.    |      | 0.71  | (H)      | 3.1   | 3.7   | S.D.     | 18.0   | 28.1   |
| MEAN     | 471    | 518    | CON. (A) | (A)    | 1.68   | (H)      | 17.7   | 26.9   | CON. (A) | (A)  | -0.05 | CORR.    |       | 0.86  | (H)      | 17.6   | 27.4   |
| S.D.     | 99     | 136    | CON. (B) | (B)    | 0.97   | CORR.    |        | 0.54   | CON. (B) | (B)  | 1.76  | CON. (A) | (A)   | 0.66  | CORR.    |        | 0.42   |
| (H)      | 97     | 133    |          |        |        | CON. (A) | (A)    | 19.34  |          |      |       | CON. (B) | (B)   | 1.04  | CON. (A) | (A)    | 41.79  |
| CORR.    |        | 0.71   |          |        |        | CON. (B) | (B)    | 0.81   |          |      |       |          |       |       | CON. (B) | (B)    | 0.66   |
| CON. (A) | (A)    | 61.13  |          |        |        |          |        |        |          |      |       |          |       |       |          |        |        |
| CON. (B) | (B)    | 0.97   |          |        |        |          |        |        |          |      |       |          |       |       |          |        |        |

Table 32. CORRELATION between - Maqaren and Dier Alla (Dry season)

| DATE     | TDS110 | IDS110 | DATE     | KMnO4 | KMnO4 | DATE     | SO4   | SO4    | DATE     | NH3  | NH3  | DATE     | K    | K     | DATE     | CI    | CI    |
|----------|--------|--------|----------|-------|-------|----------|-------|--------|----------|------|------|----------|------|-------|----------|-------|-------|
| 30 6 79  | 465    | 554    | 30 6 79  | 5.50  | 8.70  | 30 6 79  | 86.4  | 65.0   | 30 6 79  | 0.10 | 0.26 | 12 8 79  | 4.8  | 6.1   | 30 6 79  | 85.2  | 128.7 |
| 12 8 79  | 498    | 532    | 12 8 79  | 3.50  | 4.80  | 1 6 80   | 55.5  | 65.8   | 12 8 79  | 0.10 | 0.12 | 1 6 80   | 1.8  | 1.8   | 12 8 79  | 84.8  | 98.9  |
| 1 6 80   | 503    | 486    | 1 6 80   | 9.20  | 12.60 | 8 7 80   | 64.2  | 116.9  | 1 6 80   | 0.20 | 0.20 | 1 8 80   | 4.7  | 7.6   | 1 6 80   | 92.2  | 88.7  |
| 8 7 80   | 470    | 571    | 1 8 80   | 2.99  | 8.44  | 1 8 80   | 69.5  | 73.6   | 8 7 80   | 0.20 | 0.96 | 1 9 80   | 4.7  | 5.9   | 8 7 80   | 97.4  | 132.2 |
| 1 8 80   | 617    | 633    | 1 9 80   | 11.00 | 9.90  | 1 9 80   | 75.3  | 69.9   | 1 8 80   | 0.09 | 0.52 | TOTAL    | 16.0 | 21.4  | 1 8 80   | 86.1  | 99.9  |
| 1 9 80   | 606    | 604    | TOTAL    | 32.19 | 44.44 | TOTAL    | 350.9 | 391.2  | 1 9 80   | 0.12 | 0.14 | MEAN     | 4.0  | 5.4   | 1 9 80   | 88.8  | 101.8 |
| TOTAL    | 3159   | 3380   | MEAN     | 6.44  | 8.89  | MEAN     | 70.2  | 78.2   | TOTAL    | 0.81 | 2.20 | S.D.     | 1.4  | 2.5   | TOTAL    | 534.5 | 650.2 |
| MEAN     | 527    | 563    | S.D.     | 3.53  | 2.82  | S.D.     | 11.6  | 21.9   | MEAN     | 0.14 | 0.37 | (H)      | 1.3  | 2.2   | MEAN     | 89.1  | 108.4 |
| S.D.     | 68     | 52     | (H)      | 3.16  | 2.52  | (H)      | 10.4  | 19.6   | S.D.     | 0.00 | 0.32 | CORR.    |      | 1.00  | S.D.     | 4.9   | 17.7  |
| (H)      | 62     | 48     | CORR.    |       | 0.72  | CORR.    |       | -0.30  | (H)      | 0.00 | 0.30 | CON. (A) | (A)  | -1.12 | (H)      | 4.5   | 16.2  |
| CORR.    |        | 0.70   | CON. (A) | (A)   | 5.22  | CON. (A) | (A)   | 117.51 | CORR.    |      | 0.00 | CON. (B) | (B)  | 1.63  | CORR.    |       | 0.29  |
| CON. (A) | (A)    | 278.42 | CON. (B) | (B)   | 0.57  | CON. (B) | (B)   | -0.56  | CON. (A) | (A)  | 0.37 |          |      |       | CON. (A) | (A)   | 15.74 |
| CON. (B) | (B)    | 0.54   |          |       |       |          |       |        | CON. (B) | (B)  | 0.00 |          |      |       | CON. (B) | (B)   | 1.04  |

Table 33. CORRELATION between — Maqaren and Dier Alla (Rain season)

| DATE     | TDS110 | TDS110 | DATE     | KHn04  | KHn04  | DATE     | S04   | S04   | DATE     | NH3  | NH3   | DATE     | X    | X     | DATE     | C1    | C1    |
|----------|--------|--------|----------|--------|--------|----------|-------|-------|----------|------|-------|----------|------|-------|----------|-------|-------|
| 1 10 79  | 439    | 565    | 11 11 79 | 11.30  | 9.70   | 1 10 79  | 64.2  | 78.6  | 1 10 79  | 0.52 | 0.96  | 11 11 79 | 4.8  | 6.1   | 1 10 79  | 84.8  | 109.5 |
| 11 11 79 | 452    | 518    | 9 3 80   | 16.30  | 24.00  | 11 11 79 | 59.7  | 69.1  | 11 11 79 | 0.32 | 0.52  | 9 3 80   | 4.6  | 4.2   | 11 11 79 | 79.1  | 94.9  |
| 9 3 80   | 263    | 378    | 5 5 80   | 6.64   | 7.58   | 9 3 80   | 23.1  | 35.8  | 9 3 80   | 0.56 | 0.40  | 5 5 80   | 4.9  | 5.6   | 9 3 80   | 38.1  | 38.1  |
| 5 5 80   | 441    | 438    | 1 4 80   | 8.70   | 11.50  | 5 5 80   | 70.0  | 73.7  | 5 5 80   | 0.40 | 0.48  | 1 4 80   | 5.0  | 5.3   | 5 5 80   | 83.3  | 89.1  |
| 1 4 80   | 446    | 548    | 20 1 80  | 13.30  | 6.50   | 1 4 80   | 50.6  | 47.3  | 1 4 80   | 0.20 | 0.36  | 20 1 80  | 4.6  | 5.2   | 1 4 80   | 69.9  | 78.3  |
| 20 1 80  | 370    | 447    | 3 2 80   | 10.00  | 11.40  | 20 1 80  | 30.9  | 50.6  | 20 1 80  | 0.40 | 0.24  | 3 2 80   | 5.7  | 12.4  | 20 1 80  | 58.0  | 100.2 |
| 3 2 80   | 502    | 885    | 8 2 81   | 6.82   | 8.06   | 3 2 80   | 56.8  | 141.2 | 3 2 80   | 0.34 | 0.34  | 8 2 81   | 6.0  | 6.5   | 3 2 80   | 73.8  | 128.0 |
| 8 2 81   | 326    | 344    | 7 1 81   | 15.63  | 22.04  | 8 2 81   | 35.4  | 28.8  | 8 2 81   | 0.24 | 0.26  | 7 1 81   | 6.8  | 10.8  | 8 2 81   | 67.0  | 127.0 |
| 7 1 81   | 410    | 238    | 17 5 81  | 11.22  | 6.79   | 7 1 81   | 52.6  | 28.4  | 7 1 81   | 0.72 | 1.80  | 17 5 81  | 6.0  | 5.2   | 7 1 81   | 69.6  | 25.5  |
| 17 5 81  | 605    | 678    | 12 4 81  | 69.52  | 69.52  | 17 5 81  | 95.9  | 86.0  | 10 3 81  | 0.24 | 0.16  | 12 4 81  | 6.2  | 4.8   | 17 5 81  | 115.3 | 83.3  |
| 12 4 81  | 572    | 580    | 10 3 81  | 14.32  | 15.44  | 12 4 81  | 48.2  | 49.4  | TOTAL    | 3.94 | 5.52  | 10 3 81  | 6.4  | 6.9   | 12 4 81  | 83.3  | 85.1  |
| 10 3 81  | 360    | 400    | TOTAL    | 183.75 | 192.53 | 10 3 81  | 42.8  | 42.9  | MEAN     | 0.39 | 0.55  | TOTAL    | 61.0 | 73.0  | TOTAL    | 822.2 | 959.0 |
| TOTAL    | 5186   | 6011   | MEAN     | 16.70  | 17.50  | TOTAL    | 630.2 | 730.9 | S.D.     | 0.17 | 0.49  | MEAN     | 5.5  | 6.6   | MEAN     | 74.7  | 87.2  |
| MEAN     | 432    | 501    | S.D.     | 17.82  | 18.25  | MEAN     | 52.5  | 60.9  | (H)      | 0.14 | 0.47  | S.D.     | 0.8  | 2.6   | S.D.     | 19.1  | 32.1  |
| S.D.     | 97     | 170    | (H)      | 16.99  | 17.40  | S.D.     | 19.4  | 31.8  | CORR.    | 0.75 | 0.75  | (H)      | 0.8  | 2.5   | (H)      | 18.2  | 30.6  |
| (H)      | 93     | 163    | CORR.    | 0.97   | 0.97   | (H)      | 18.6  | 30.4  | CORR.    | (A)  | -0.39 | CORR.    | 0.48 | 0.48  | CORR.    | 0.28  | 0.28  |
| CORR.    | 0.68   | 0.68   | CON. (A) | (A)    | 0.80   | CORR.    | 0.54  | 0.54  | CON. (A) | (A)  | 2.42  | CON. (A) | (A)  | -2.14 | CON. (A) | (A)   | 52.84 |
| CON. (A) | (A)    | 8.76   | CON. (B) | (B)    | 1.00   | CON. (A) | (A)   | 14.18 | CON. (B) | (B)  | 1.59  | CON. (B) | (B)  | 1.59  | CON. (B) | (B)   | 0.46  |
| CON. (B) | (B)    | 1.18   |          |        |        | CON. (B) | (B)   | 0.89  |          |      |       |          |      |       |          |       |       |

Table 34. CORRELATION between — Maqaren and Dier Alla (Whole season)

| DATE     | TDS110 | TDS110 | DATE     | KHn04  | KHn04  | DATE     | S04    | S04    | DATE     | NH3  | NH3  | DATE     | X     | X     | DATE     | C1     | C1     |
|----------|--------|--------|----------|--------|--------|----------|--------|--------|----------|------|------|----------|-------|-------|----------|--------|--------|
| 30 6 79  | 465    | 554    | 30 6 79  | 5.50   | 8.70   | 30 6 79  | 86.4   | 65.0   | 30 6 79  | 0.10 | 0.26 | 12 8 79  | 4.8   | 6.1   | 30 6 79  | 85.2   | 128.7  |
| 12 8 79  | 498    | 532    | 12 8 79  | 3.50   | 4.80   | 1 10 79  | 64.2   | 78.6   | 12 8 79  | 0.10 | 0.12 | 11 11 79 | 4.8   | 6.1   | 12 8 79  | 84.8   | 98.9   |
| 1 10 79  | 439    | 565    | 11 11 79 | 11.30  | 9.70   | 11 11 79 | 59.7   | 69.1   | 1 10 79  | 0.52 | 0.96 | 20 1 80  | 4.6   | 5.2   | 1 10 79  | 84.8   | 109.5  |
| 11 11 79 | 452    | 518    | 20 1 80  | 13.30  | 6.50   | 11 11 79 | 59.7   | 69.1   | 11 11 79 | 0.32 | 0.52 | 3 2 80   | 5.7   | 12.4  | 11 11 79 | 79.1   | 94.9   |
| 20 1 80  | 370    | 447    | 3 2 80   | 10.00  | 11.40  | 20 1 80  | 30.9   | 50.6   | 20 1 80  | 0.40 | 0.24 | 9 3 80   | 4.6   | 4.2   | 20 1 80  | 58.0   | 100.2  |
| 3 2 80   | 502    | 885    | 9 3 80   | 16.30  | 24.00  | 3 2 80   | 56.8   | 141.2  | 3 2 80   | 0.34 | 0.34 | 1 4 80   | 5.0   | 5.3   | 3 2 80   | 73.8   | 128.0  |
| 9 3 80   | 263    | 378    | 1 4 80   | 8.70   | 11.50  | 9 3 80   | 23.1   | 35.8   | 9 3 80   | 0.56 | 0.40 | 5 5 80   | 4.9   | 5.6   | 9 3 80   | 38.1   | 38.1   |
| 1 4 80   | 446    | 548    | 5 5 80   | 6.64   | 7.58   | 1 4 80   | 50.6   | 47.3   | 1 4 80   | 0.20 | 0.36 | 1 6 80   | 1.8   | 1.8   | 1 4 80   | 69.9   | 78.3   |
| 5 5 80   | 441    | 438    | 1 6 80   | 9.20   | 12.60  | 5 5 80   | 70.0   | 73.7   | 5 5 80   | 0.40 | 0.48 | 1 8 80   | 4.7   | 7.6   | 5 5 80   | 83.3   | 89.1   |
| 1 6 80   | 503    | 486    | 1 8 80   | 2.99   | 8.44   | 1 6 80   | 55.5   | 65.8   | 1 6 80   | 0.20 | 0.20 | 1 9 80   | 4.7   | 5.9   | 1 6 80   | 92.2   | 88.7   |
| 8 7 80   | 470    | 571    | 1 9 80   | 11.00  | 9.90   | 8 7 80   | 64.2   | 110.9  | 8 7 80   | 0.20 | 0.96 | 15 10 80 | 5.0   | 5.8   | 8 7 80   | 97.4   | 132.2  |
| 1 8 80   | 617    | 633    | 24 12 80 | 0.60   | 3.30   | 1 8 80   | 69.5   | 73.6   | 1 8 80   | 0.09 | 0.52 | 11 11 80 | 5.3   | 5.2   | 1 8 80   | 86.1   | 99.9   |
| 1 9 80   | 606    | 604    | 7 1 81   | 15.63  | 22.04  | 1 9 80   | 75.3   | 69.9   | 1 9 80   | 0.12 | 0.14 | 24 12 80 | 6.3   | 6.3   | 1 9 80   | 88.8   | 101.8  |
| 15 10 80 | 491    | 506    | 8 2 81   | 6.82   | 8.06   | 15 10 80 | 70.0   | 76.5   | 15 10 80 | 0.20 | 0.20 | 7 1 81   | 6.8   | 10.8  | 15 10 80 | 88.3   | 93.6   |
| 11 11 80 | 623    | 625    | 10 3 81  | 14.32  | 15.44  | 11 11 80 | 71.2   | 77.8   | 11 11 80 | 0.16 | 0.20 | 8 2 81   | 6.0   | 6.5   | 11 11 80 | 104.4  | 95.7   |
| 24 12 80 | 326    | 311    | 12 4 81  | 69.52  | 69.52  | 24 12 80 | 60.5   | 58.8   | 7 1 81   | 0.72 | 1.80 | 10 3 81  | 6.4   | 6.9   | 7 1 81   | 69.6   | 25.5   |
| 7 1 81   | 410    | 238    | 17 5 81  | 11.22  | 6.79   | 7 1 81   | 52.6   | 28.4   | 8 2 81   | 0.24 | 0.26 | 12 4 81  | 6.2   | 4.8   | 8 2 81   | 67.0   | 127.0  |
| 8 2 81   | 326    | 344    | 10 3 81  | 14.32  | 15.44  | 8 2 81   | 35.4   | 28.8   | 10 3 81  | 0.24 | 0.16 | 17 5 81  | 6.0   | 5.2   | 12 4 81  | 83.3   | 85.1   |
| 10 3 81  | 360    | 400    | 28 9 81  | 7.60   | 7.00   | 12 4 81  | 48.2   | 49.4   | 1 8 81   | 0.06 | 0.06 | 1 8 81   | 18.0  | 8.5   | 1 8 81   | 106.5  | 142.0  |
| 12 4 81  | 572    | 580    | TOTAL    | 165.32 | 190.25 | 17 5 81  | 95.9   | 86.0   | TOTAL    | 5.17 | 8.18 | 28 9 81  | 10.0  | 8.5   | 28 9 81  | 110.0  | 103.0  |
| 17 5 81  | 605    | 678    | MEAN     | 9.18   | 10.57  | 1 8 81   | 82.0   | 95.0   | MEAN     | 0.27 | 0.43 | TOTAL    | 121.6 | 140.2 | 28 9 81  | 1765.9 | 2043.5 |
| 1 8 81   | 499    | 499    | S.D.     | 4.35   | 5.42   | TOTAL    | 1264.8 | 1430.2 | S.D.     | 0.17 | 0.41 | MEAN     | 6.1   | 7.0   | MEAN     | 84.1   | 97.3   |
| 28 9 81  | 551    | 577    | (H)      | 4.24   | 5.27   | MEAN     | 60.2   | 68.1   | (H)      | 0.17 | 0.40 | S.D.     | 3.2   | 3.8   | S.D.     | 18.0   | 28.1   |
| TOTAL    | 10835  | 11909  | CORR.    | 0.76   | 0.76   | S.D.     | 18.1   | 27.5   | CORR.    | 0.71 | 0.71 | (H)      | 3.1   | 3.7   | (H)      | 17.6   | 27.4   |
| MEAN     | 471    | 518    | CON. (A) | (A)    | 1.94   | CON. (A) | (A)    | 19.31  | CON. (A) | (A)  | 0.05 | CON. (A) | (A)   | 0.66  | CON. (A) | (A)    | 0.42   |
| S.D.     | 99     | 136    | CON. (B) | (B)    | 0.94   | CON. (B) | (B)    | 0.81   | CON. (B) | (B)  | 1.76 | CON. (B) | (B)   | 1.04  | CON. (B) | (B)    | 0.66   |
| (H)      | 97     | 133    |          |        |        | CON. (A) | (A)    | 0.81   |          |      |      |          |       |       |          |        |        |
| CORR.    | 0.71   | 0.71   |          |        |        |          |        |        |          |      |      |          |       |       |          |        |        |
| CON. (A) | (A)    | 61.13  |          |        |        |          |        |        |          |      |      |          |       |       |          |        |        |
| CON. (B) | (B)    | 0.97   |          |        |        |          |        |        |          |      |      |          |       |       |          |        |        |

Table 35. CORRELATION between -- Maqaren and Dier Alla (Rain season)

| DATE     | TPSIU | TDSIU | DATE      | KH <sub>10</sub> M | KH <sub>10</sub> M | DATE     | S04   | S04   | DATE      | NH3  | NH3   | DATE     | K    | K     | DATE      | CI    | CI    |
|----------|-------|-------|-----------|--------------------|--------------------|----------|-------|-------|-----------|------|-------|----------|------|-------|-----------|-------|-------|
| 1 10 79  | 439   | 565   | 11 11 79  | 11.30              | 9.70               | 1 10 79  | 64.2  | 78.0  | 1 10 79   | 0.52 | 0.36  | 11 11 79 | 4.8  | 6.1   | 1 10 79   | 84.8  | 109.5 |
| 11 11 79 | 452   | 518   | 9 3 80    | 16.30              | 24.00              | 11 11 79 | 59.7  | 69.1  | 11 11 79  | 0.32 | 0.52  | 9 3 80   | 4.6  | 4.2   | 11 11 79  | 79.1  | 94.9  |
| 9 3 80   | 263   | 378   | 5 5 80    | 6.64               | 7.58               | 9 3 80   | 23.1  | 35.8  | 9 3 80    | 0.56 | 0.40  | 5 5 80   | 4.9  | 5.6   | 9 3 80    | 38.1  | 38.1  |
| 5 5 80   | 441   | 430   | 1 4 80    | 8.70               | 11.50              | 5 5 80   | 70.0  | 73.7  | 5 5 80    | 0.40 | 0.48  | 1 4 80   | 5.0  | 5.3   | 5 5 80    | 83.3  | 89.1  |
| 1 4 80   | 446   | 548   | 20 1 80   | 13.30              | 6.50               | 1 4 80   | 50.6  | 47.3  | 1 4 80    | 0.20 | 0.36  | 20 1 80  | 4.6  | 5.2   | 1 4 80    | 69.9  | 78.3  |
| 20 1 80  | 370   | 447   | 3 2 80    | 10.00              | 11.40              | 20 1 80  | 30.9  | 50.6  | 20 1 80   | 0.40 | 0.24  | 3 2 80   | 5.7  | 12.4  | 20 1 80   | 58.0  | 100.2 |
| 3 2 80   | 502   | 885   | 8 2 81    | 6.82               | 8.06               | 3 2 80   | 56.8  | 141.2 | 3 2 80    | 0.34 | 0.34  | 8 2 81   | 6.0  | 6.5   | 3 2 80    | 73.8  | 128.0 |
| 8 2 81   | 326   | 344   | 7 1 81    | 15.63              | 22.04              | 8 2 81   | 35.4  | 28.8  | 8 2 81    | 0.24 | 0.26  | 7 1 81   | 6.8  | 10.8  | 8 2 81    | 67.0  | 127.0 |
| 7 1 81   | 410   | 238   | 17 5 81   | 11.22              | 6.79               | 7 1 81   | 52.6  | 28.4  | 7 1 81    | 0.72 | 1.80  | 17 5 81  | 6.0  | 5.2   | 7 1 81    | 69.6  | 25.5  |
| 17 5 81  | 605   | 678   | 12 4 81   |                    |                    | 17 5 81  | 95.9  | 86.0  | 10 3 81   | 0.24 | 0.16  | 12 4 81  | 6.2  | 4.8   | 17 5 81   | 115.3 | 83.3  |
| 12 4 81  | 572   | 580   | 10 3 81   | 14.32              | 15.44              | 12 4 81  | 48.2  | 49.4  | TOTAL     | 3.94 | 5.52  | 10 3 81  | 6.4  | 6.9   | 12 4 81   | 83.3  | 85.1  |
| 10 3 81  | 360   | 400   | TOTAL     | 114.23             | 123.01             | 10 3 81  | 42.8  | 42.0  | MEAN      | 0.39 | 0.55  | TOTAL    | 61.0 | 73.0  | TOTAL     | 822.2 | 959.0 |
| TOTAL    | 5186  | 6011  | MEAN      | 11.42              | 12.30              | TOTAL    | 630.2 | 730.9 | S.D.      | 0.17 | 0.49  | MEAN     | 5.5  | 6.6   | MEAN      | 74.7  | 87.2  |
| MEAN     | 432   | 501   | S.D.      | 3.45               | 6.27               | MEAN     | 52.5  | 60.9  | (H)       | 0.14 | 0.47  | S.D.     | 0.8  | 2.6   | S.D.      | 19.1  | 32.1  |
| S.D.     | 97    | 170   | (H)       | 3.27               | 5.95               | S.D.     | 19.4  | 31.8  | CORR.     | 0.75 | (H)   | (H)      | 0.8  | 2.5   | (H)       | 18.2  | 30.6  |
| (H)      | 93    | 163   | CORR.     |                    | 0.74               | (H)      | 18.6  | 30.4  | CORR. (A) | (A)  | -0.39 | CORR.    | 0.48 |       | CORR.     |       | 0.28  |
| CORR.    | 0.68  |       | CORR. (A) | (A)                | -3.00              | CORR.    |       | 0.54  | CORR. (B) | (B)  | 2.42  | COV. (A) | (A)  | -2.14 | CORR. (A) | (A)   | 52.84 |
| CON. (A) | (A)   | -8.76 | CON. (D)  | (D)                | 1.34               | CON. (A) | (A)   | 14.18 | COV. (B)  | (B)  | 1.59  | CON. (B) | (B)  | 0.46  |           |       |       |
| CON. (B) | (B)   | 1.18  |           |                    |                    | CON. (B) | (B)   | 0.89  |           |      |       |          |      |       |           |       |       |

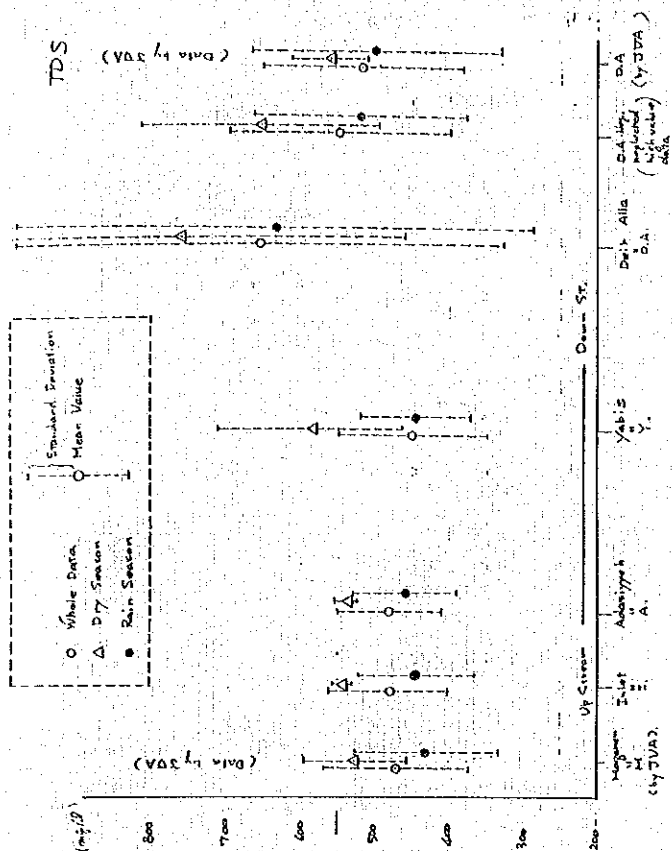


Fig. 1 TDS, Mean Value and Range of Standard Deviation on the Canal

T.D.S (WAT) - DRY

INLET ○  
 ADASIYYEH △  
 YABIS □  
 DEIR ALLA ×

II III IV V VI VII VIII

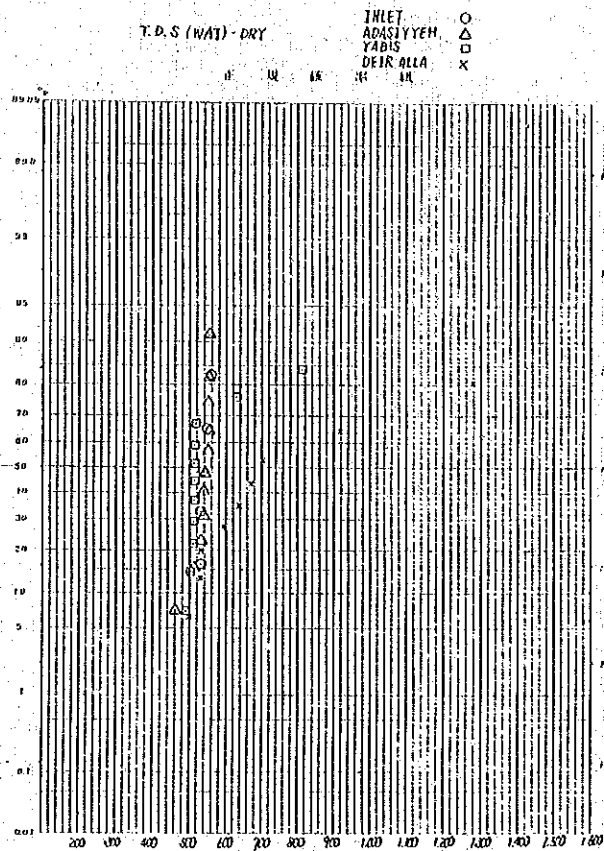


Fig. 2-1 TDS, Normal Probability (Dry) by WAI

T.D.S (WAT) - RAIN

INLET ○  
 ADASIYYEH △  
 YABIS □  
 DEIR ALLA ×

II III IV V VI VII VIII

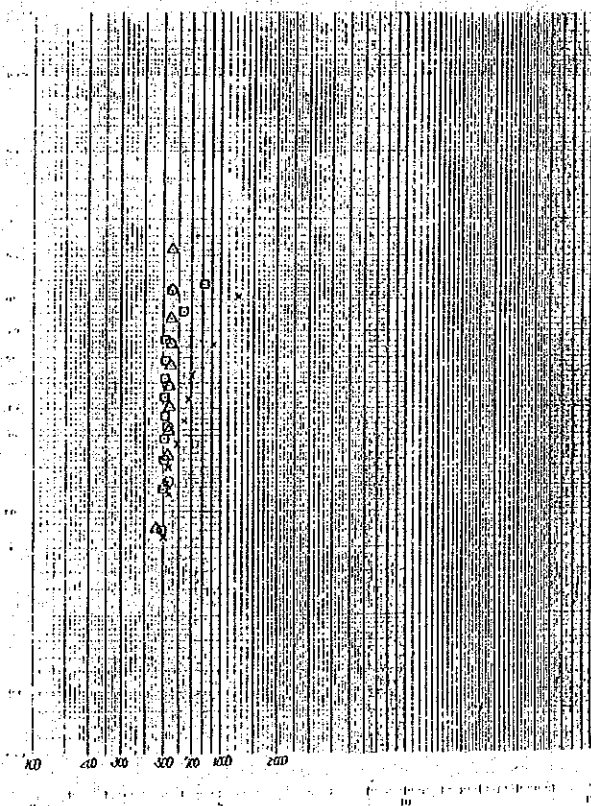


Fig. 2-2 TDS, Logarithmic Normal Probability (Dry) by WAI

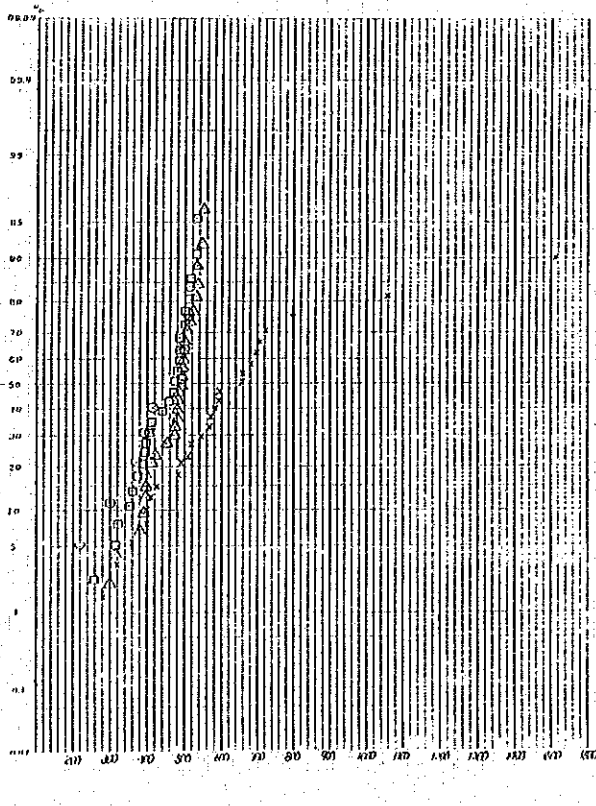


Fig. 3-1 TDS, Normal Probability (Rain) by WAI

T.D.S (WAJ)-RAIN

INLET ○  
ADASIYYEH Δ  
YABIS □  
DEIRALLA X

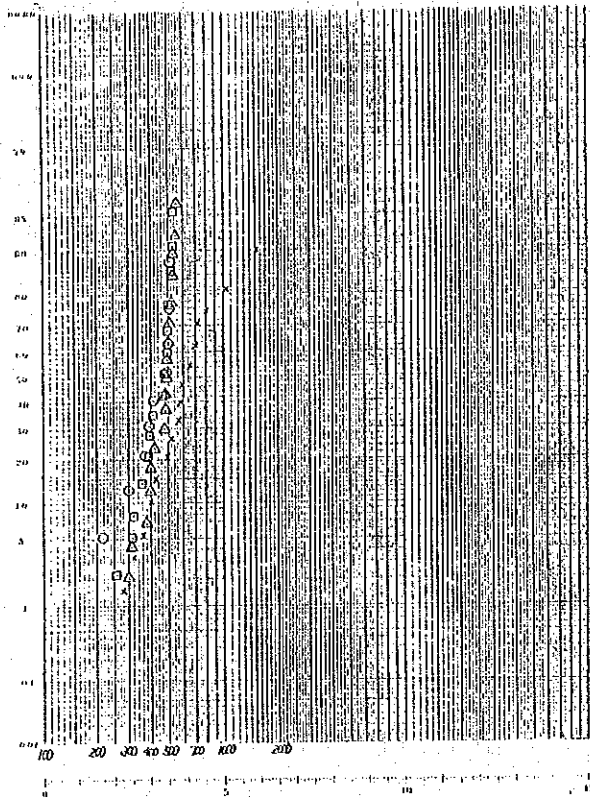


Fig. 3-2 TDS, Logarithmic Normal Probability (Rain) by WAJ

TDS (JVA)-DRY

Maqaren ○  
DIERALLA Δ

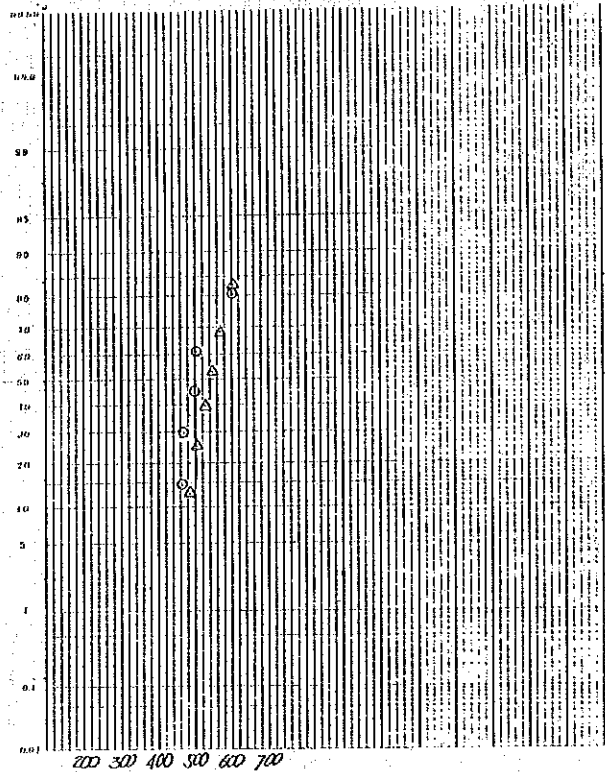


Fig. 4 TDS, Normal Probability (Dry) by JVA

TDS (JVA)-RAIN

Maqaren ○  
DIERALLA Δ

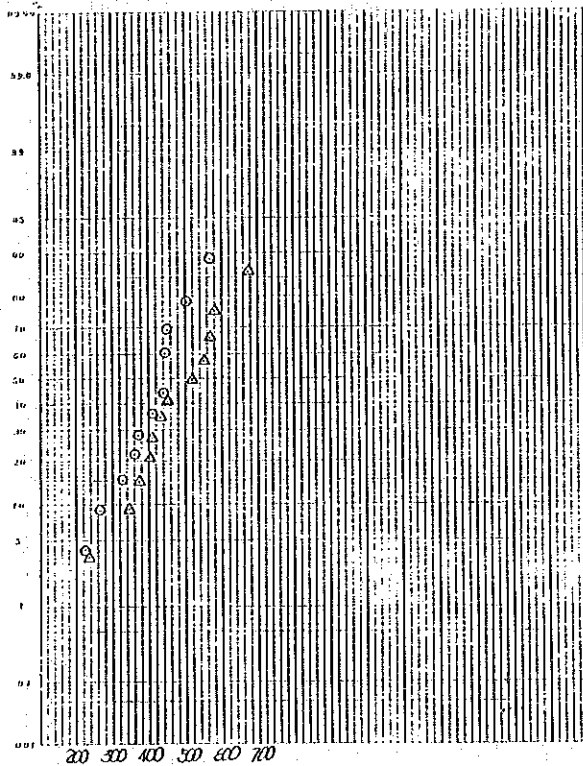


Fig. 5 TDS, Normal Probability (Rain) by JVA

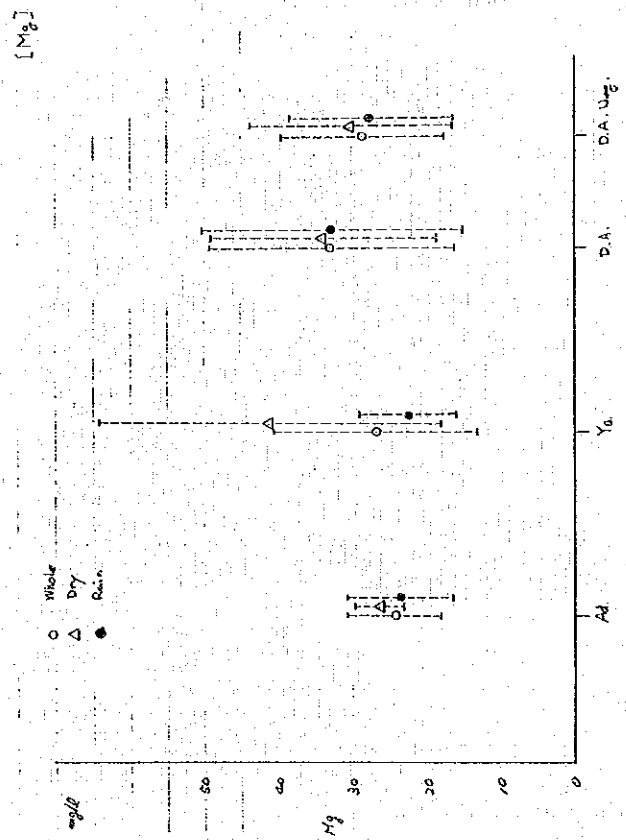


Fig. 6 Magnesium (Mg), Mean Value (M-Value) and Range of Standard Deviation (S.D.)

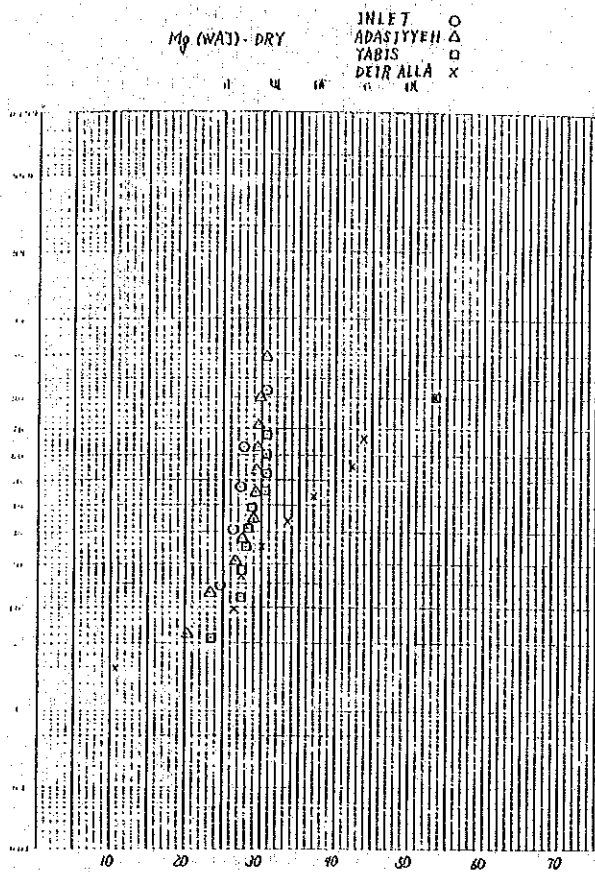


Fig. 7 Mg, Normal Probability (Dry) by WAI

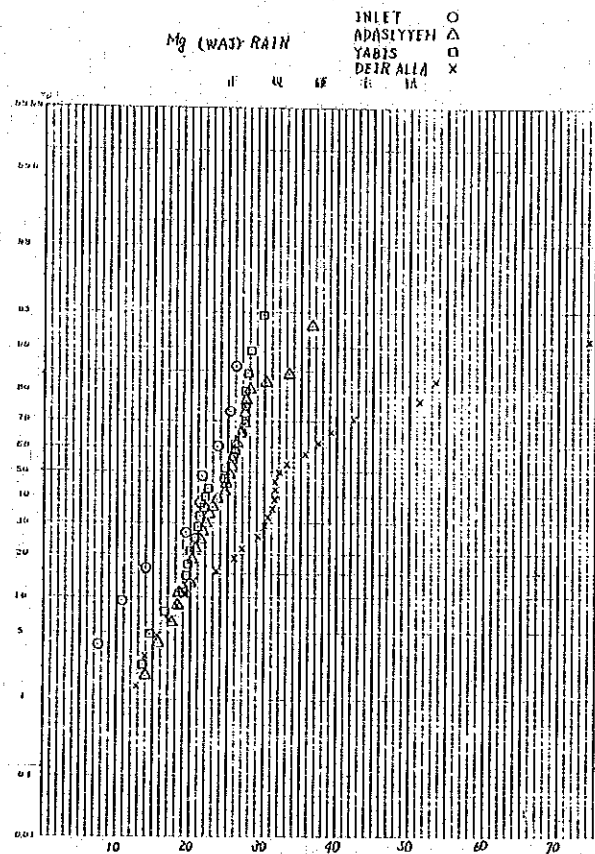


Fig. 8 Mg, Normal Probability (Rain) by WAI

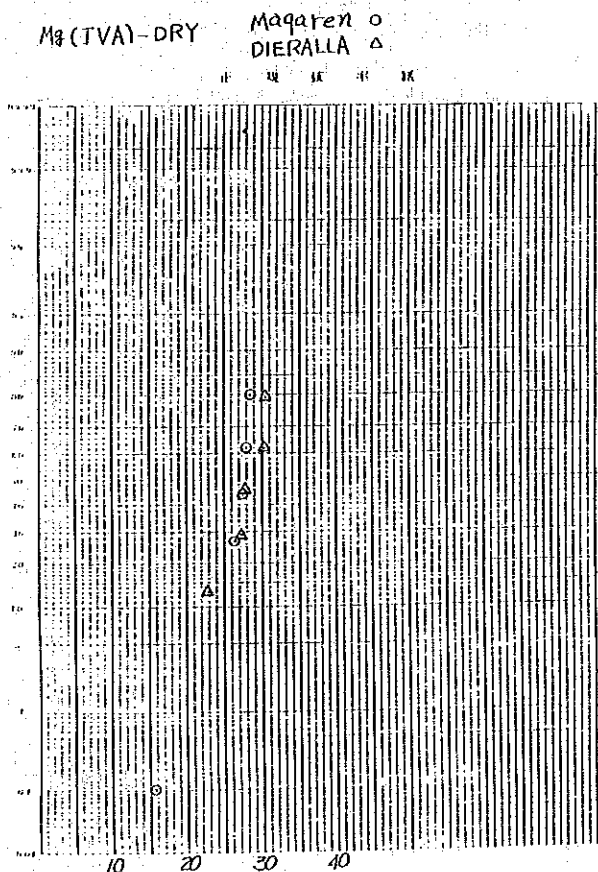


Fig. 9 Mg, Normal Probability (Dry) by JVA

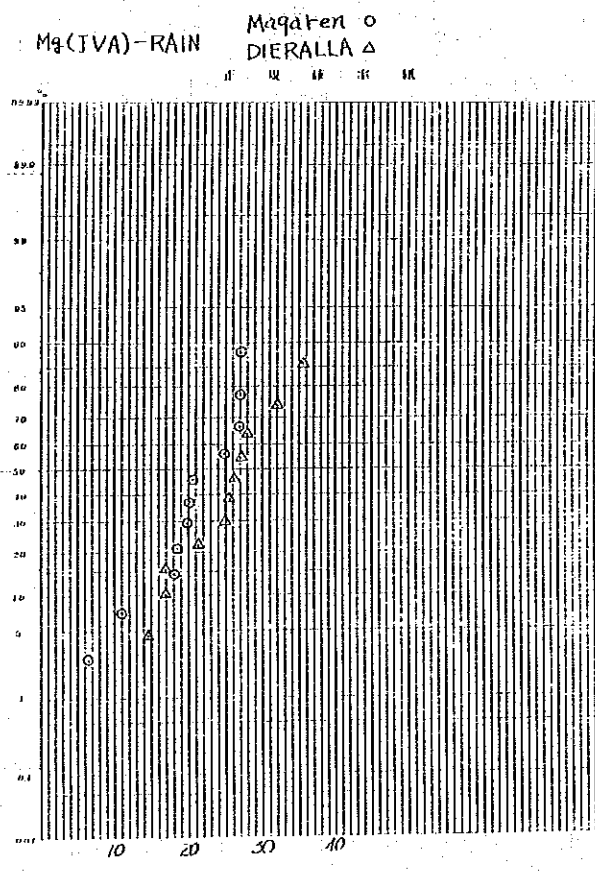


Fig. 10 Mg, Normal Probability (Rain) by JVA

[Ca]

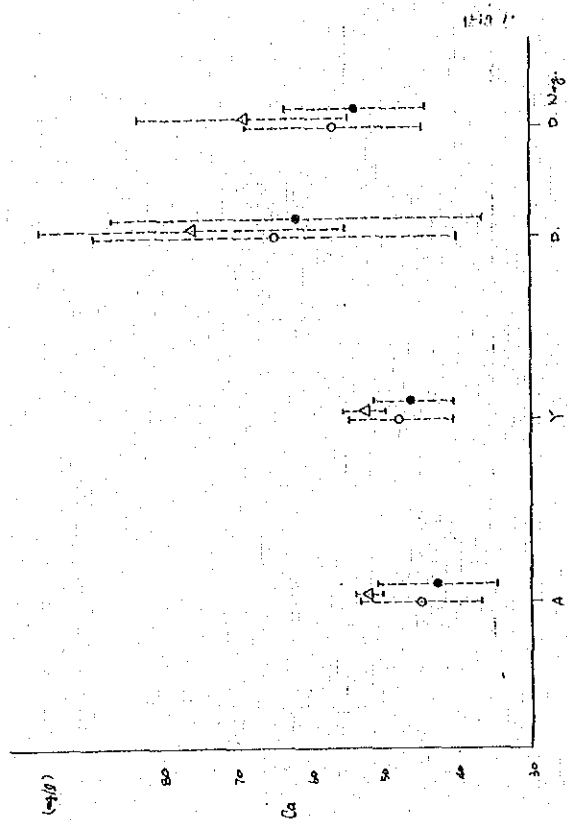


Fig. 11 Calcun (Ca), M-Value and Range of S.D.

Ca (WAS) - RAIN

|           |   |
|-----------|---|
| INLET     | ○ |
| ADASIYYEH | △ |
| YABIS     | □ |
| DEJR ALLA | × |

Ca (WAS) - DRY

INLET ○  
ADASIYYEH △  
YABIS □  
DEJR ALLA ×

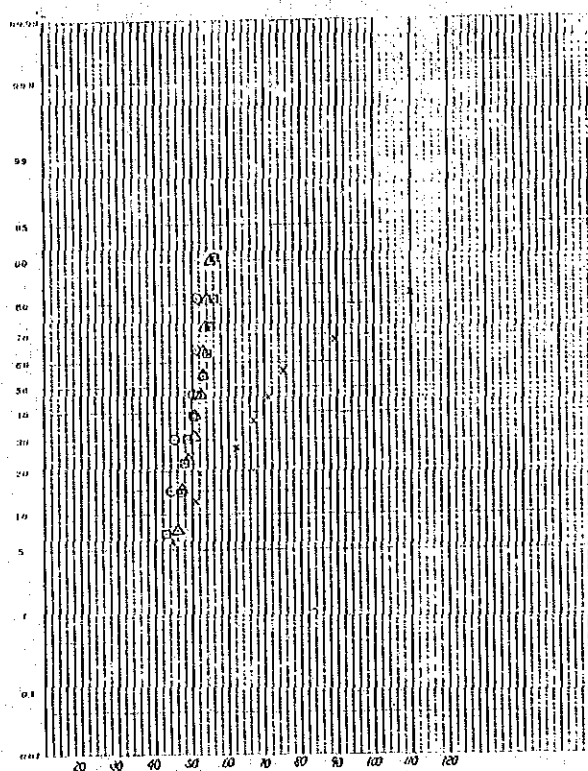


Fig. 12 Ca, Normal Probability by WAS

Ca (JVA) - DRY

Maqaren ○  
DIERALLA △

il ul lk l' lk

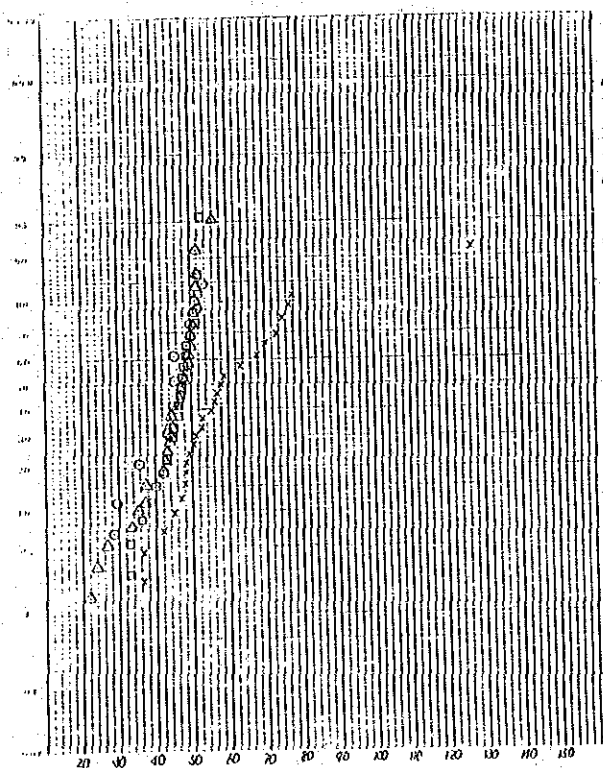


Fig. 13 Ca, Normal Probability (Rain) by WAS

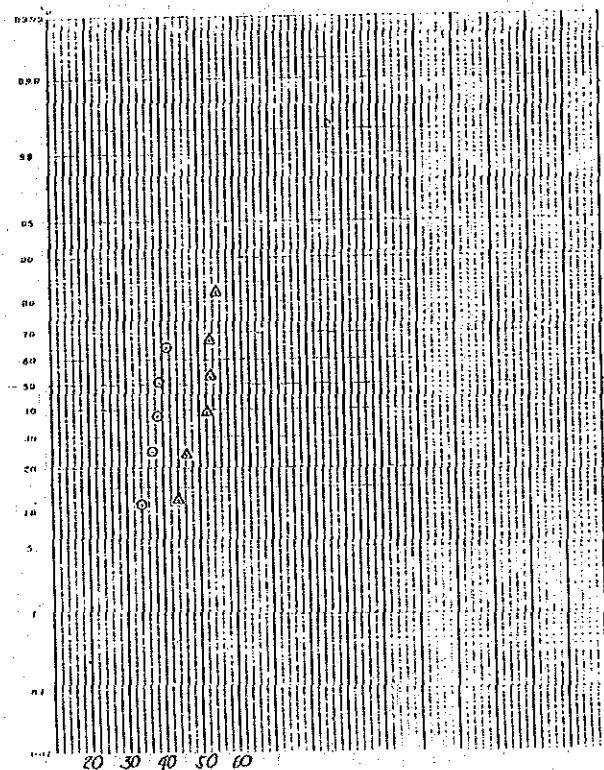


Fig. 14 Ca, Normal Probability (Dry) by JVA

Ca(JVA)-RAIN Maqatex o  
DIERALLA Δ

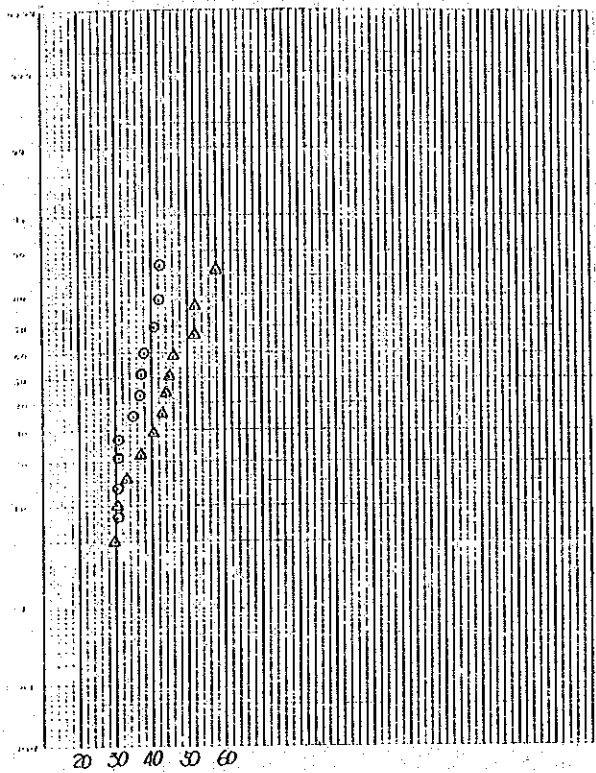


Fig. 15 Ca, Normal Probability (Rain) by JVA

Na (WAI)-DRY INLET o  
ADASIYYEH Δ  
YABIS □  
DEIR ALLA x

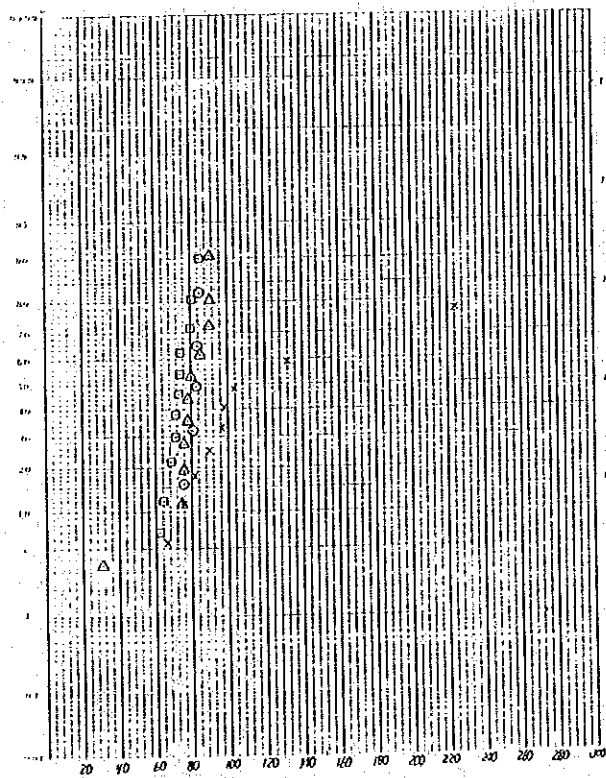


Fig. 17 Na, Normal Probability (Dry) by WAI

[Na]

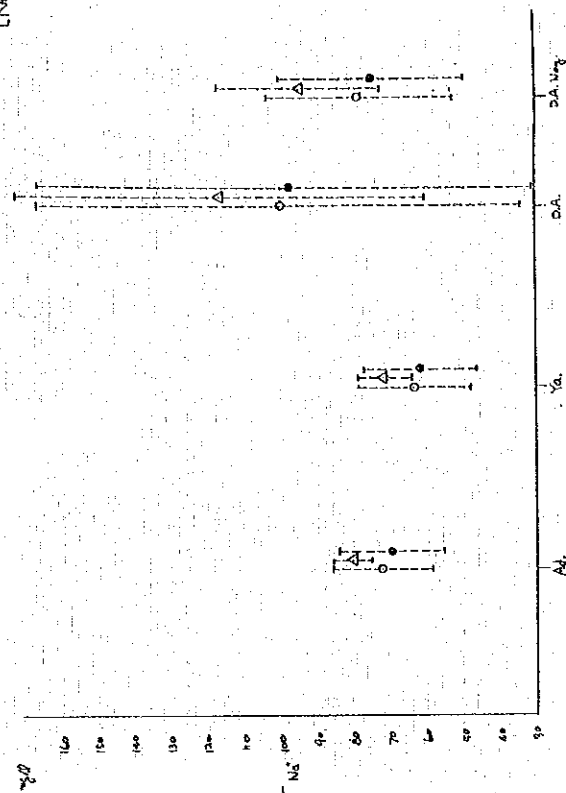


Fig. 16 Sodium (Na), M-Value and Range of S.D.

Na (WAI)-RAIN INLET o  
ADASIYYEH Δ  
YABIS □  
DEIR ALLA x

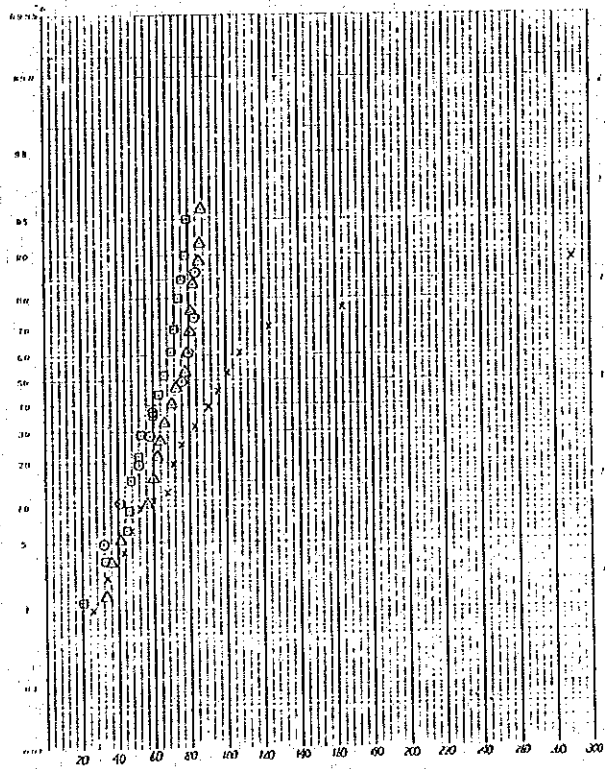


Fig. 18 Na, Normal Probability (Rain) by WAI



Na (JVA)-DRY

Maqareh o  
DIERALLA Δ

0 20 40 60 80 100

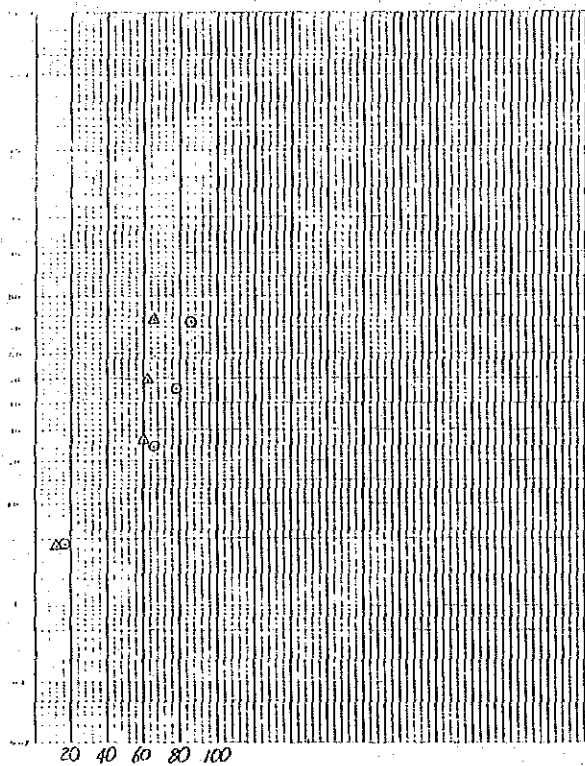


Fig. 19 Na, Normal Probability (Dry) by JVA

Na (JVA)-RAIN

Maqareh o  
DIERALLA Δ

0 20 40 60 80 100

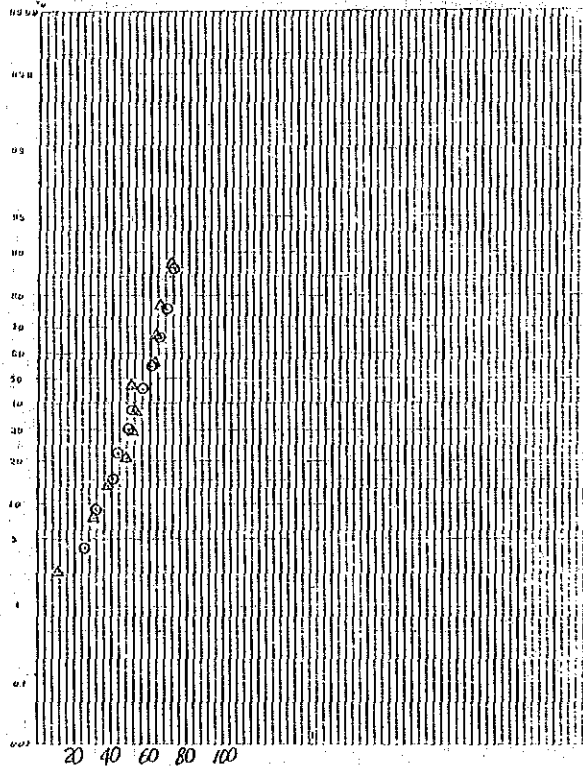


Fig. 20 Na, Normal Probability (Rain) by JVA

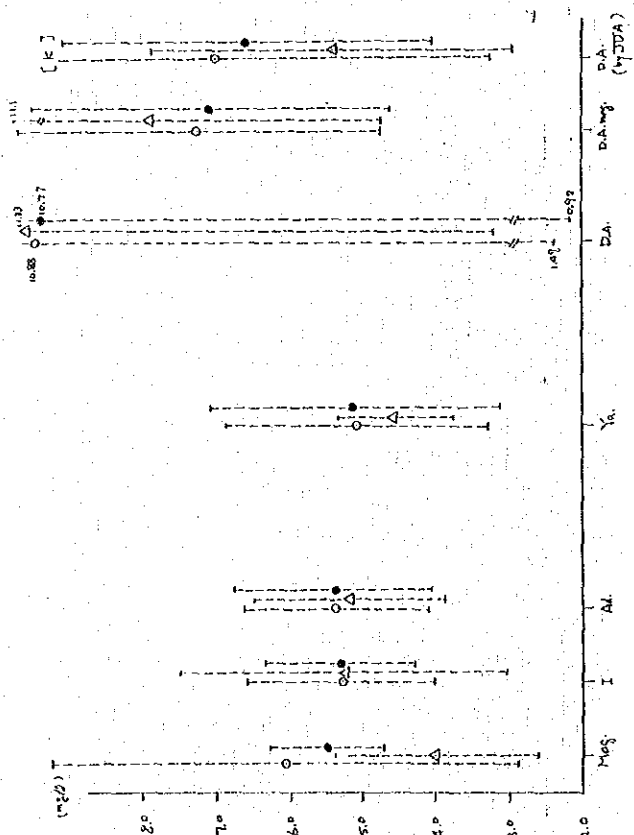


Fig. 21 Potassium (K), M-Value and Range of S.D.

K (WAI)-DRY

INLET o  
AMASTIYEH Δ  
YABIS o  
DEIRALLA x

0 20 40 60 80 100

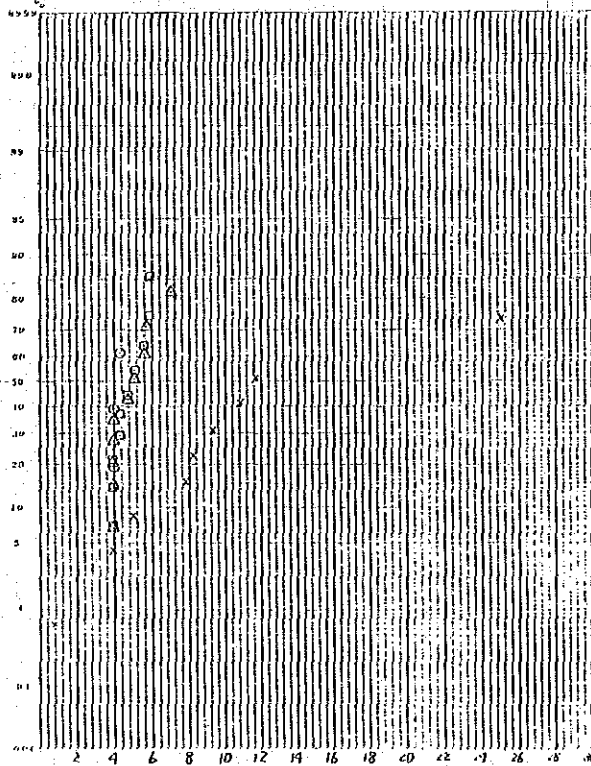


Fig. 22 K, Normal Probability (Dry) by WAI

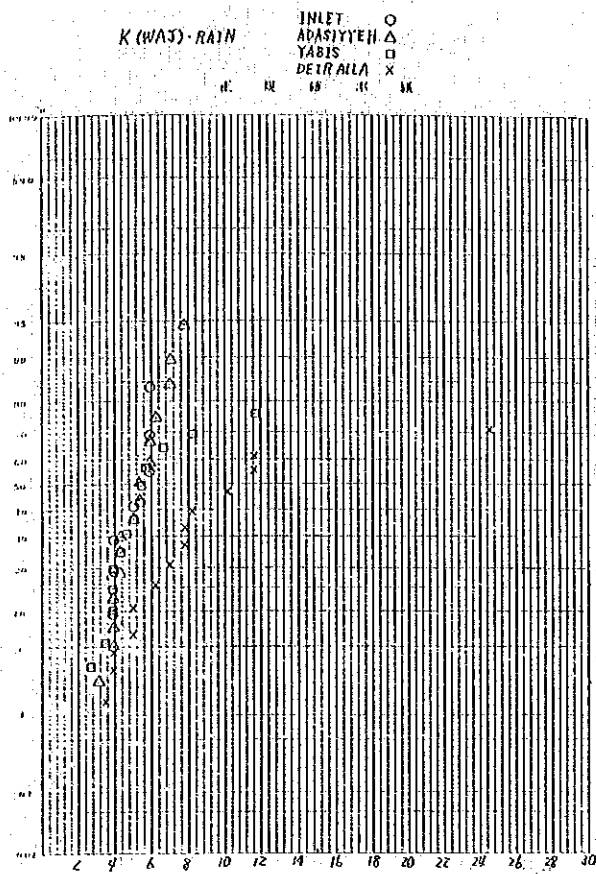


Fig. 23 K, Normal Probability (Rain) by WAS

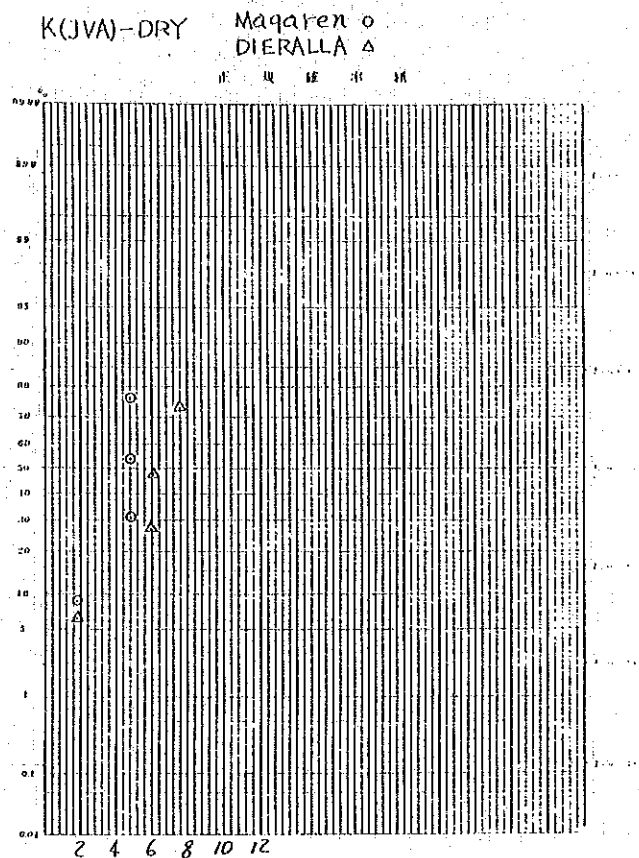


Fig. 24 K, Normal Probability (Dry) by JVA

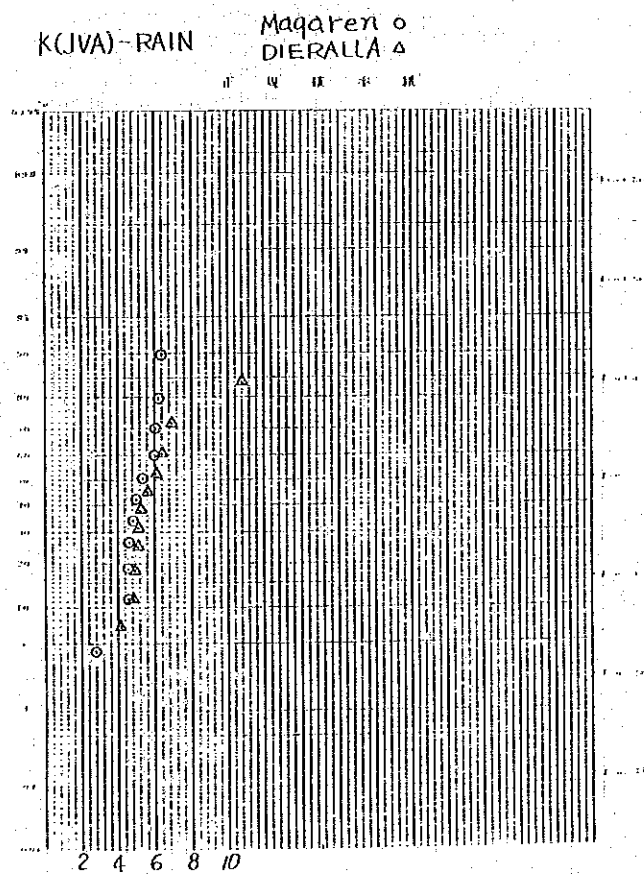


Fig. 25 K, Normal Probability (Rain) by JVA

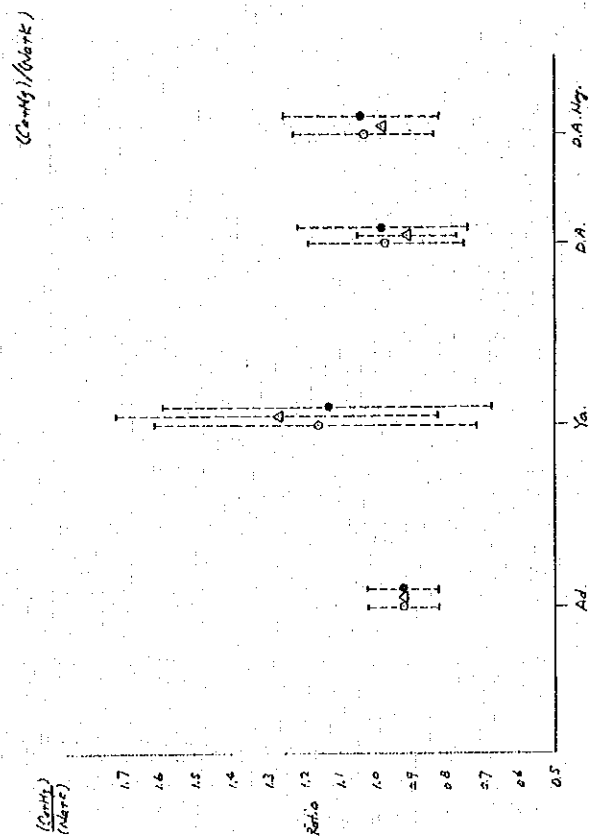


Fig. 26 Ratio of (Ca+Mg) to (Na+K), M-Value and Range of S.D.

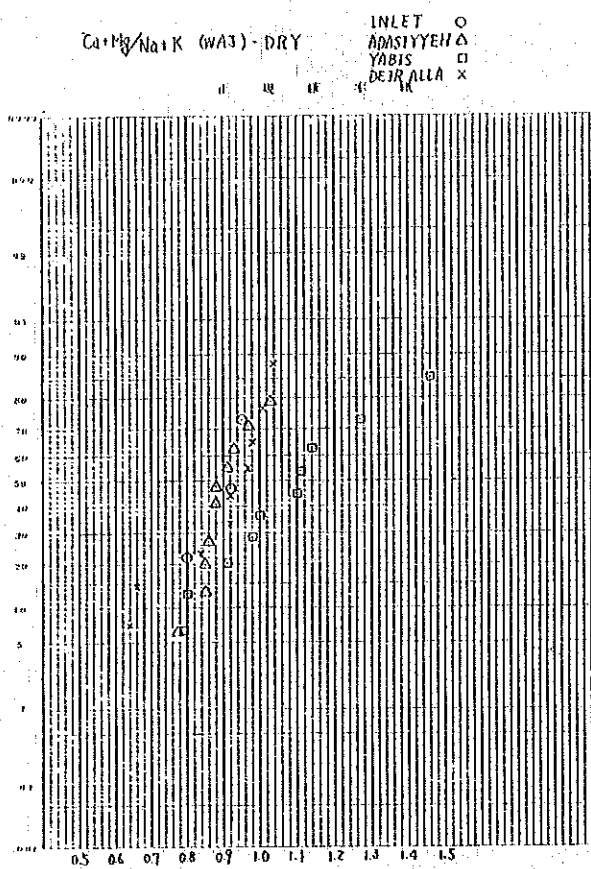


Fig. 27 Ca+Mg/Na+K Ratio, Normal Probability (Dry)

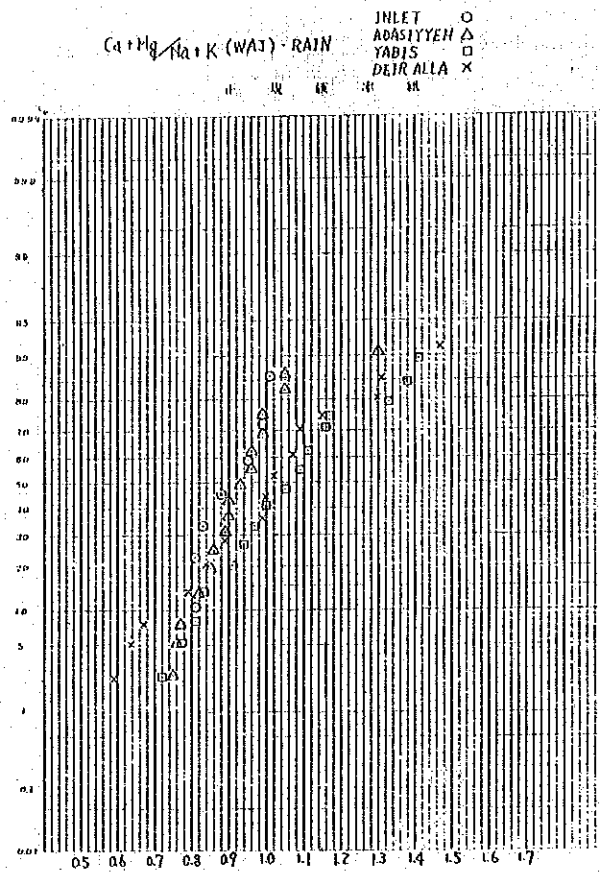


Fig. 28 Ca+Mg/Na+K, Normal Probability (Rain)

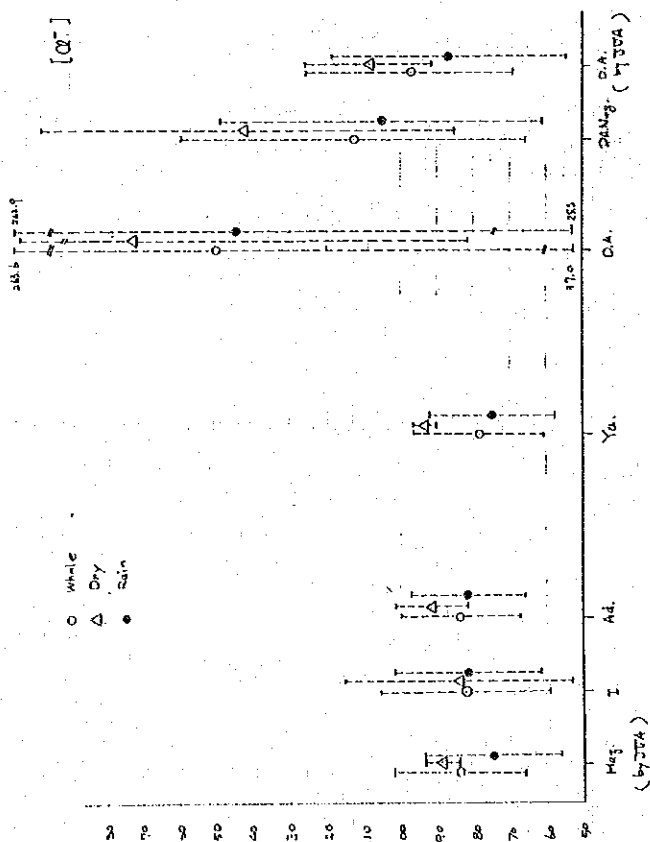


Fig. 29 Chloride Ion (Cl<sup>-</sup>), M-Value and Range of S.D.

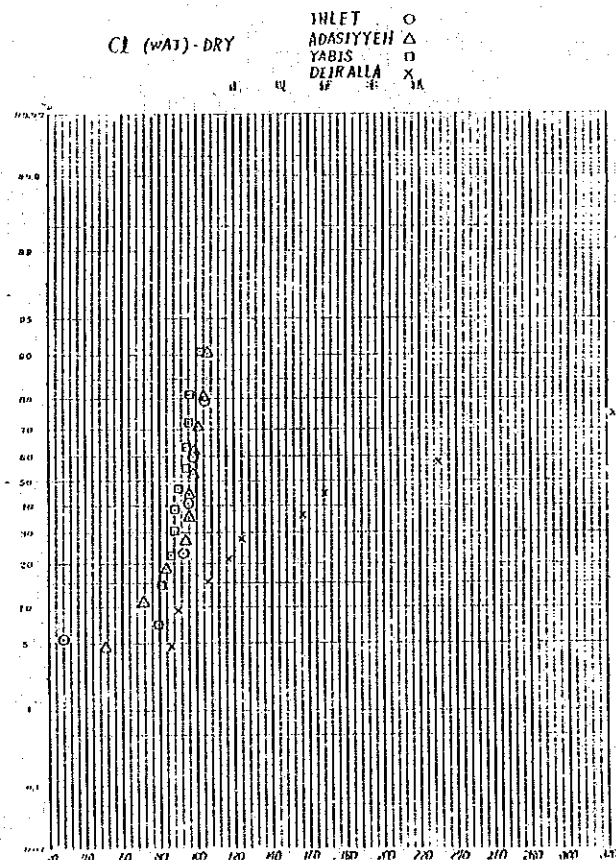


Fig. 30-1 Cl<sup>-</sup>, Normal Probability (Dry) by WAJ

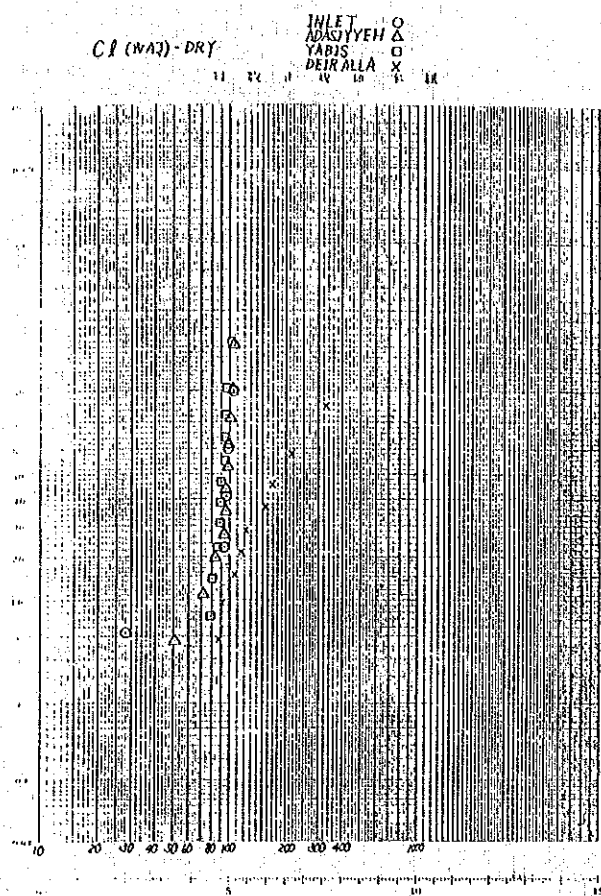


Fig. 30-2 CI, Logarithmic Normal Probability (Dry) by WAI

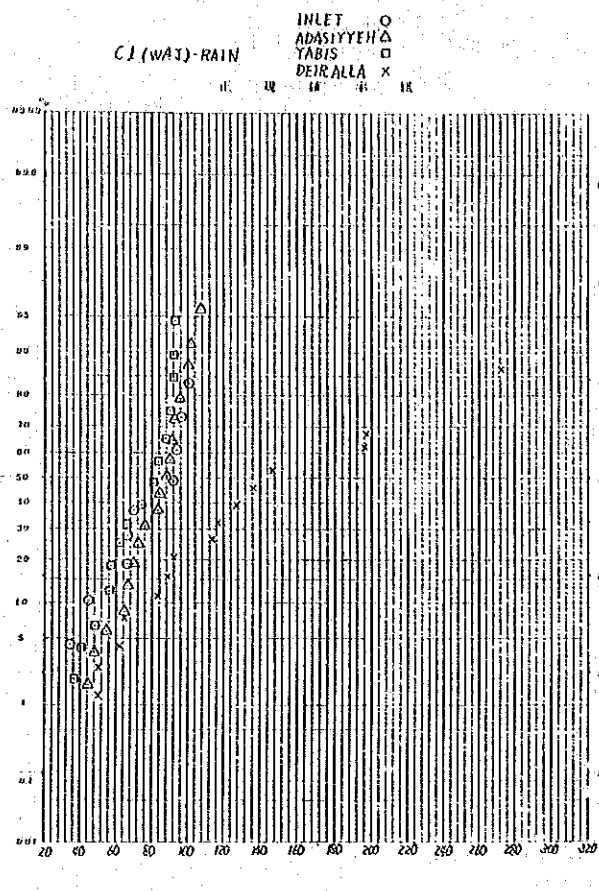


Fig. 31-1 CI, Normal Probability (Rain) by WAI

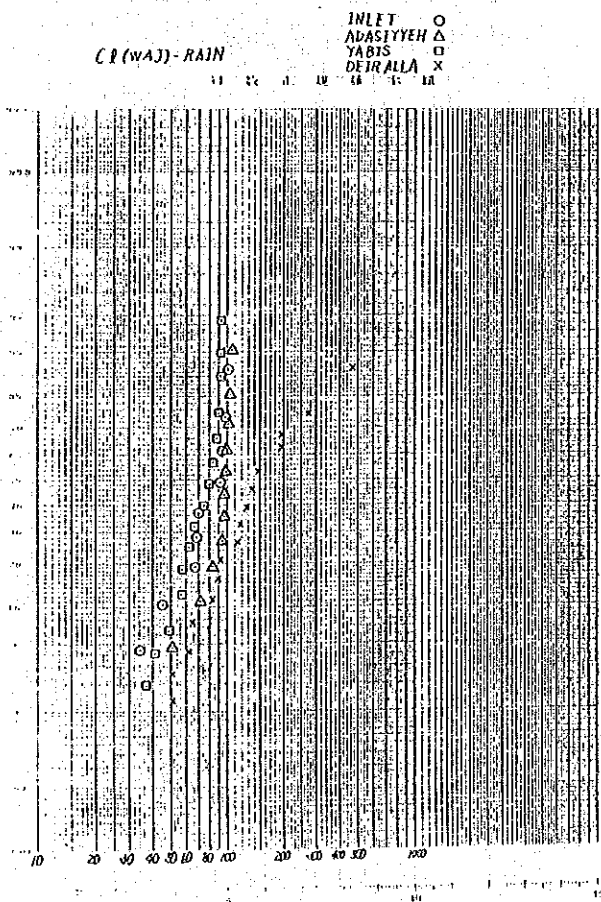


Fig. 31-2 CI, Logarithmic Normal Probability (Rain) by WAI

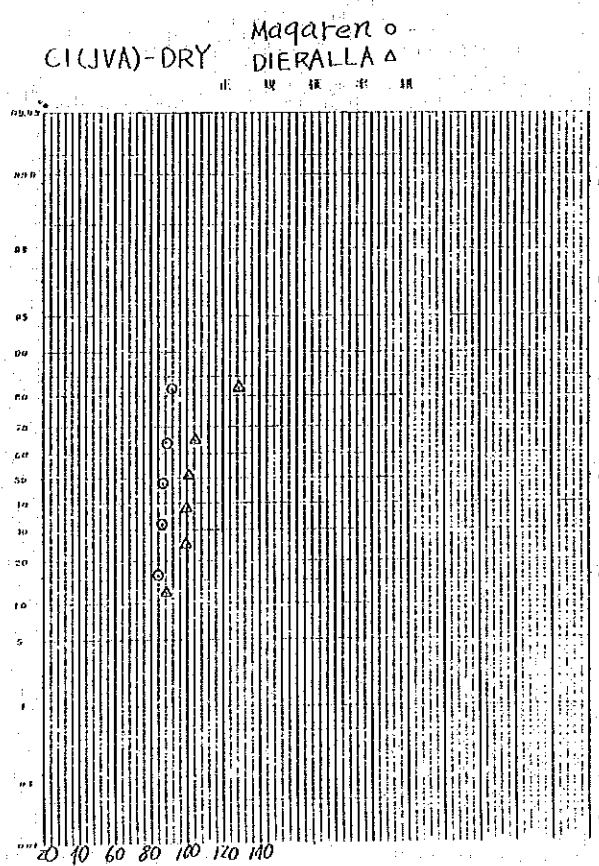


Fig. 32 CI, Normal Probability (Dry) by IVA

CI (JVA) - RAIN

Maqaren o  
DIERALLA Δ

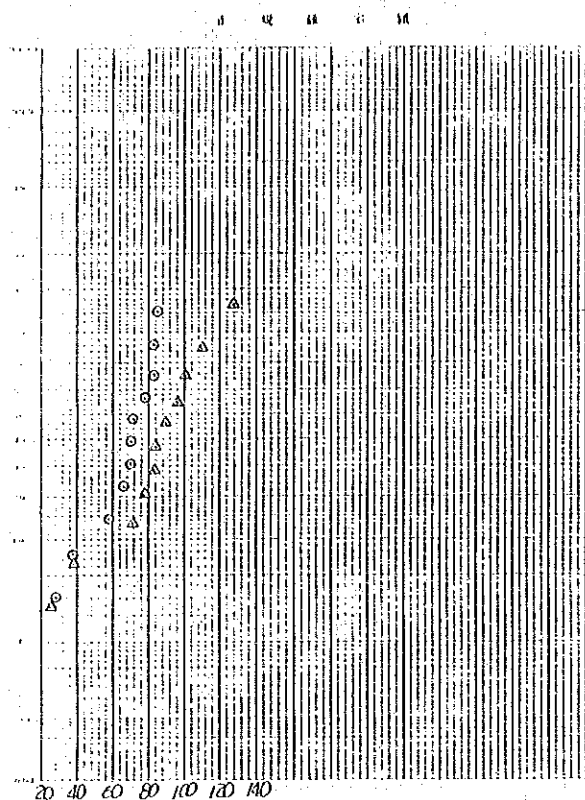


Fig. 33 Cl<sup>-</sup>, Normal Probability (Rain) by JVA

SO<sub>4</sub> (WAI) - DRY

INLET O  
ADASIYYEH Δ  
YABIS □  
DEIR ALLA X

il ul ll ll ll ll

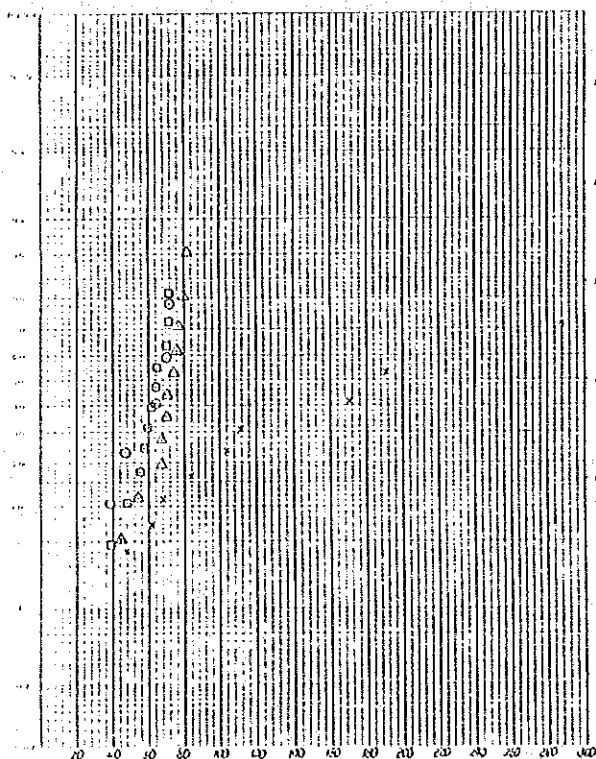


Fig. 35-1 SO<sub>4</sub><sup>2-</sup>, Normal Probability (Dry) by WAI

[SO<sub>4</sub><sup>2-</sup>]

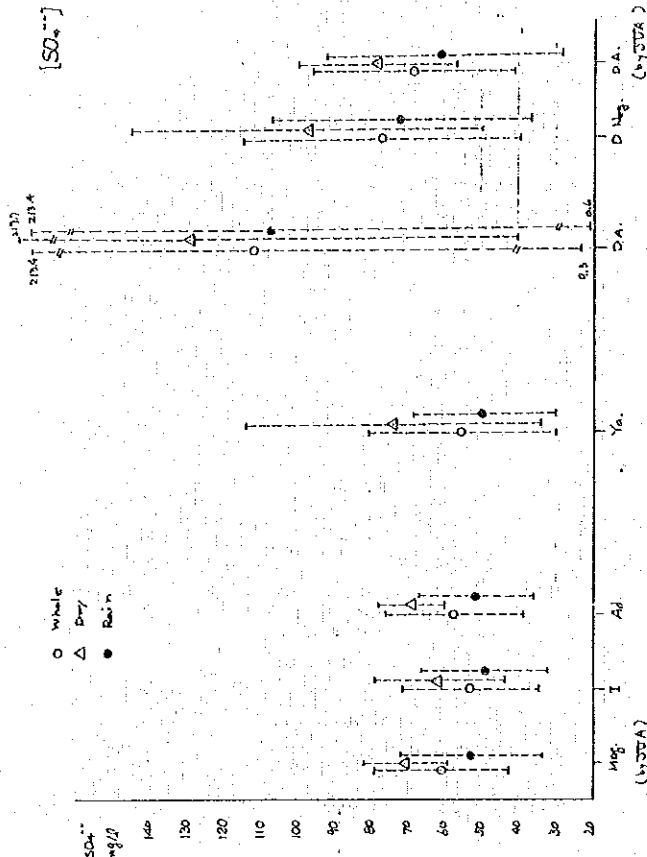


Fig. 34 Sulfate Ion (SO<sub>4</sub><sup>2-</sup>), M-Value and Range of S.D.

SO<sub>4</sub> (WAI) - DRY

INLET O  
ADASIYYEH Δ  
YABIS □  
DEIR ALLA X

il ul ll ll ll ll

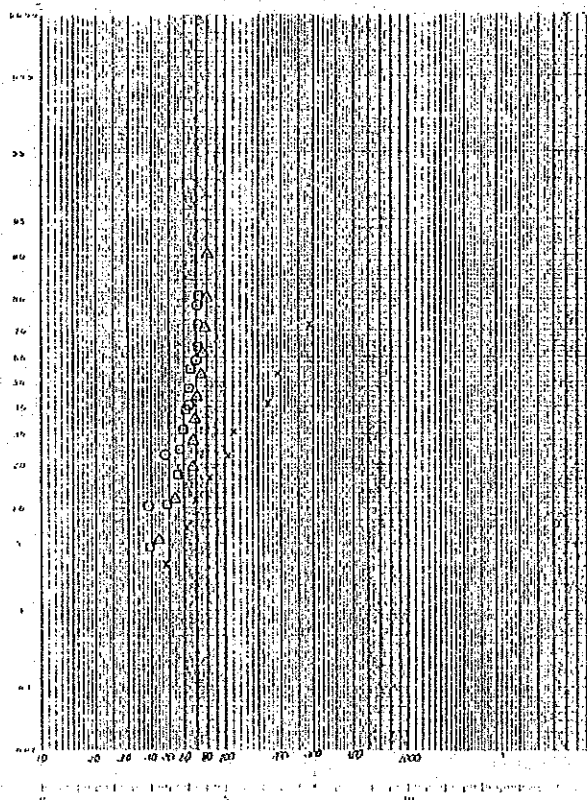


Fig. 35-2 SO<sub>4</sub><sup>2-</sup>, Logarithmic Normal Probability (Dry) by WAI

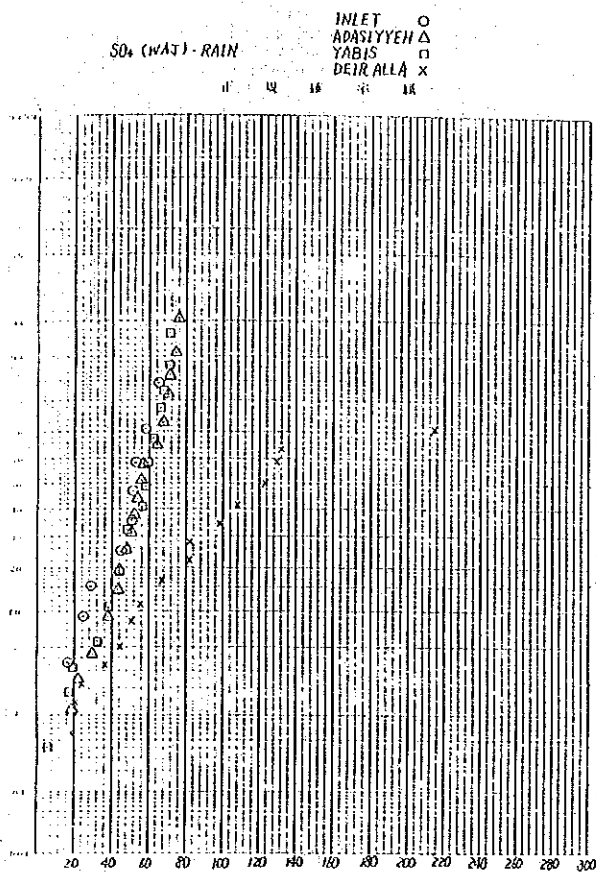


Fig. 36-1 SO<sub>4</sub><sup>2-</sup>, Normal Probability (Rain) by WAI

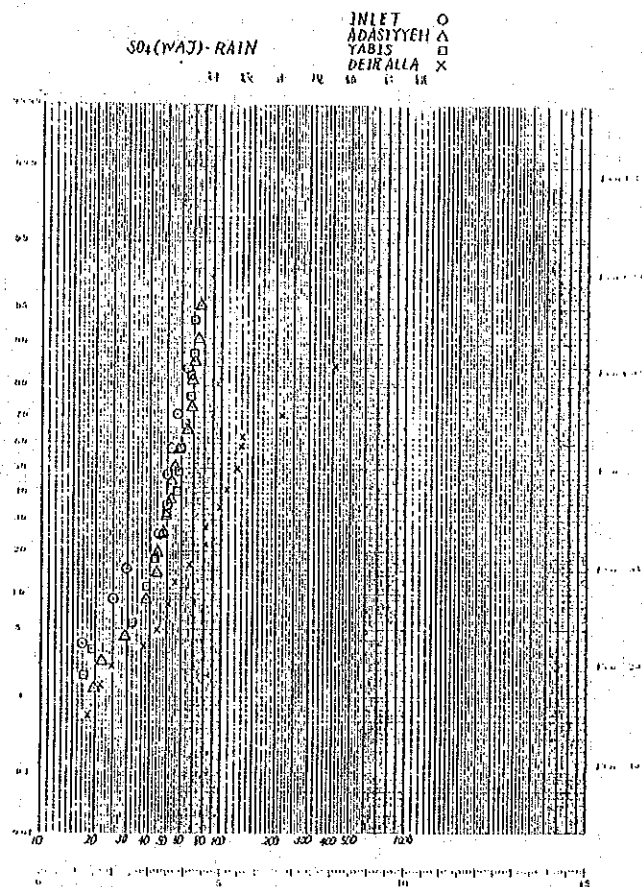


Fig. 36-2 SO<sub>4</sub><sup>2-</sup>, Logarithmic Normal Probability (Rain) by WAI

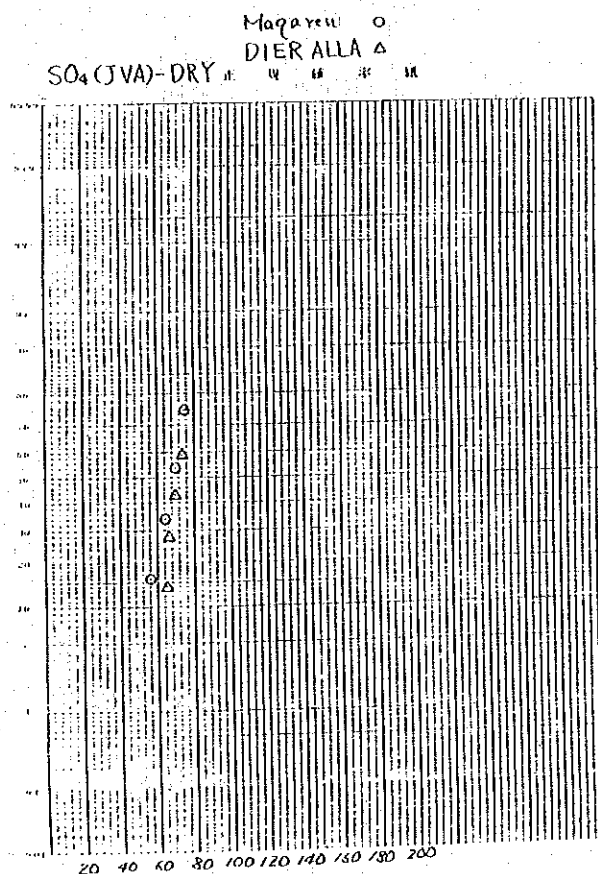


Fig. 37 SO<sub>4</sub><sup>2-</sup>, Normal Probability (Dry) by JVA

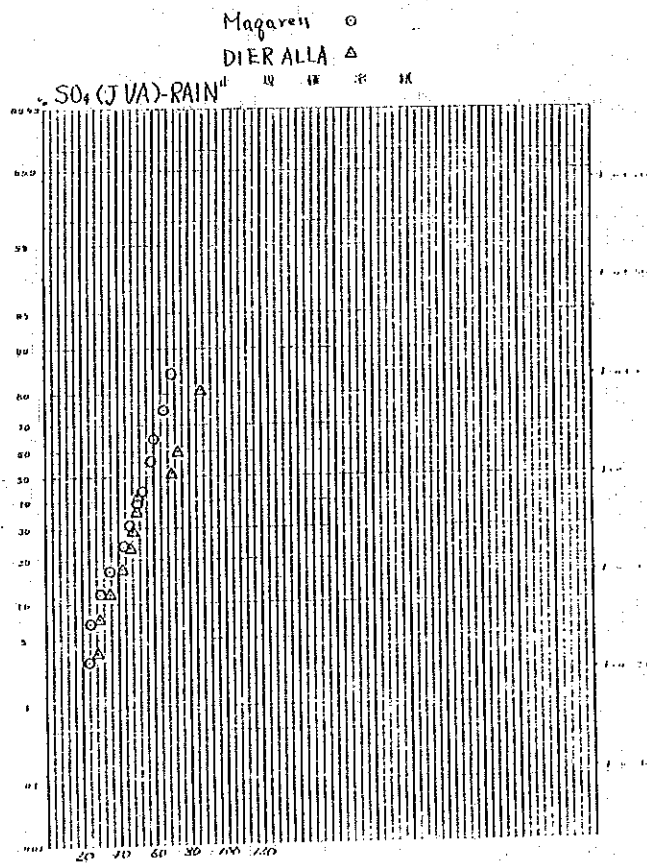


Fig. 38 SO<sub>4</sub><sup>2-</sup>, Normal Probability (Rain) by JVA

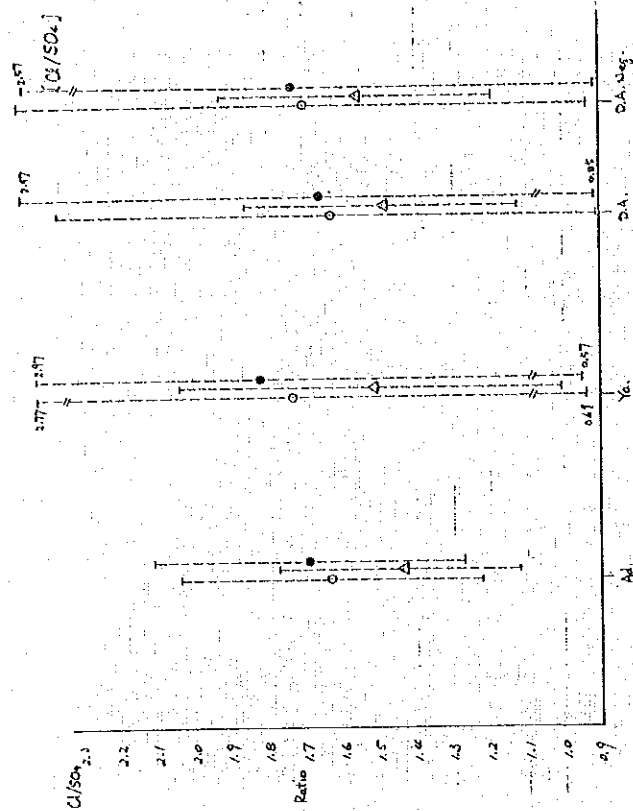


Fig. 39 Ratio of  $\text{Cl}^-$  to  $\text{SO}_4^{2-}$ , M-Value and Range of S.D.

$\text{Cl}/\text{SO}_4$  (WAI) - RAIN

INLET ○  
ADASIYYEH △  
YABIS □  
DEIR ALLA ×

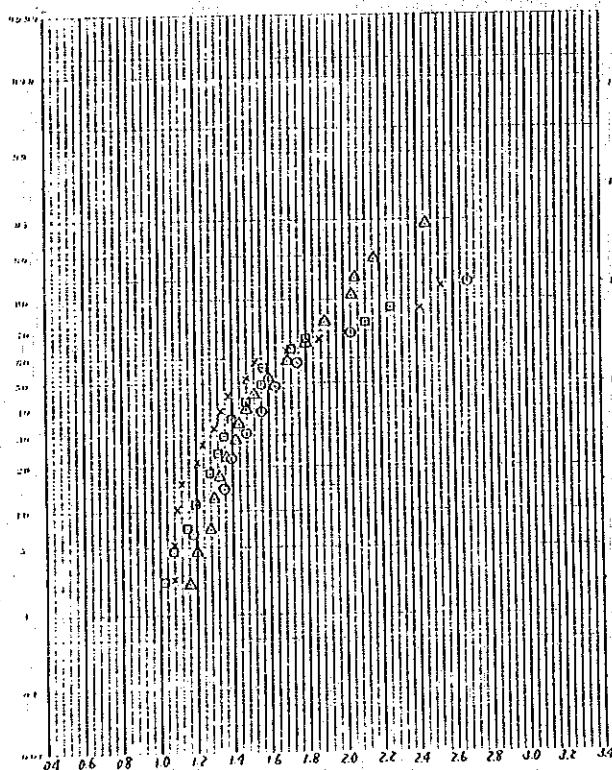


Fig. 41  $\text{Cl}^-/\text{SO}_4^{2-}$ , Normal Probability (Rain) by WAI

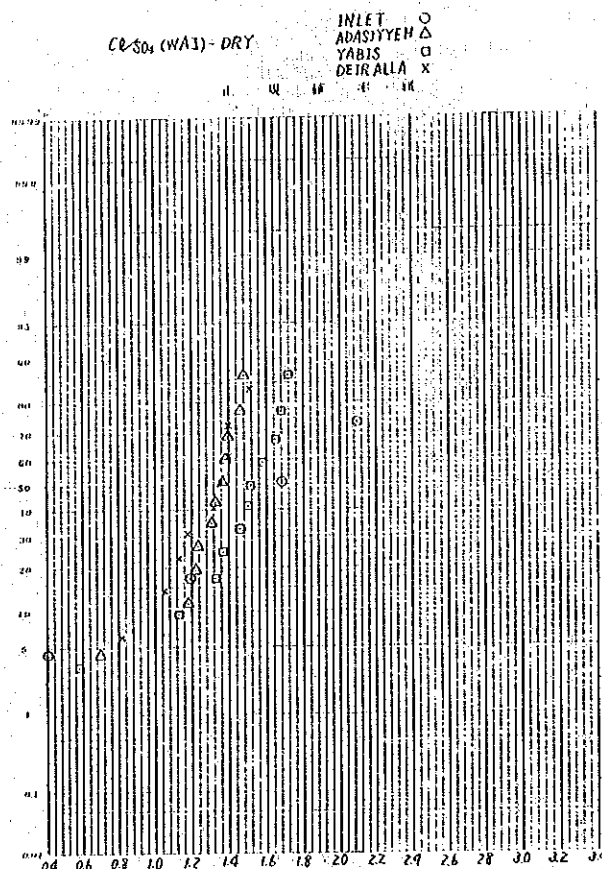


Fig. 40  $\text{Cl}^-/\text{SO}_4^{2-}$ , Normal Probability (Dry) by WAI

$\text{CO}_3^{2-}$

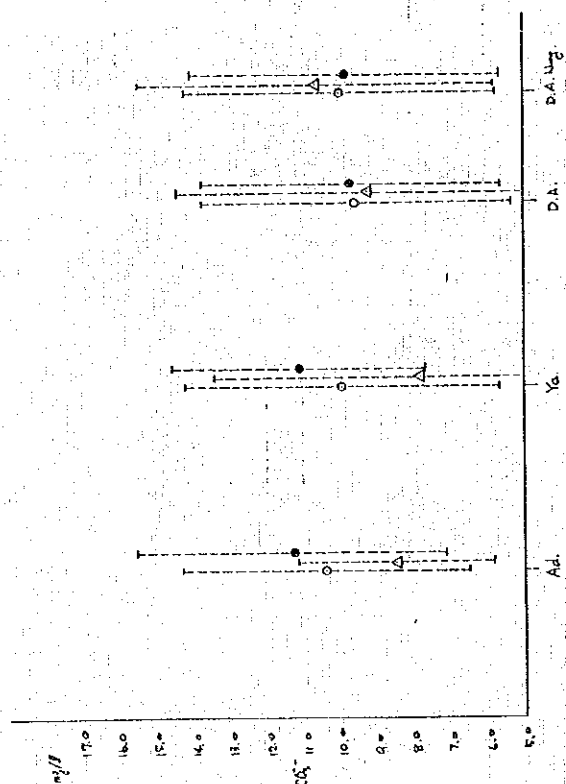


Fig. 42 Carbonate Ion ( $\text{CO}_3^{2-}$ ), M-Value and Range of S.D.



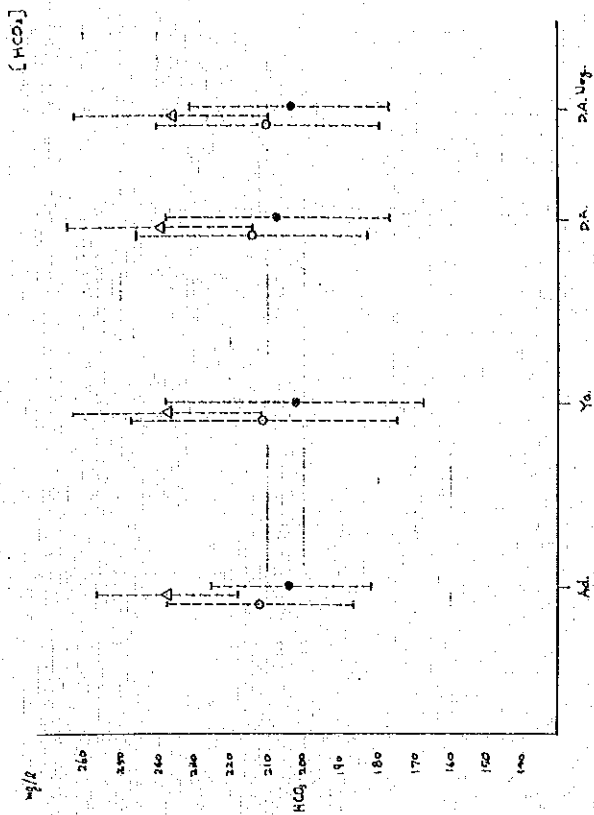


Fig. 43 Bicarboxate ion ( $\text{HCO}_3^-$ ), M-Value and Range of S.D.

$\text{HCO}_3^-$  (WAT) - RAIN

INLET ○  
ADASIYYEH △  
YABIS □  
DEIRALLA ×

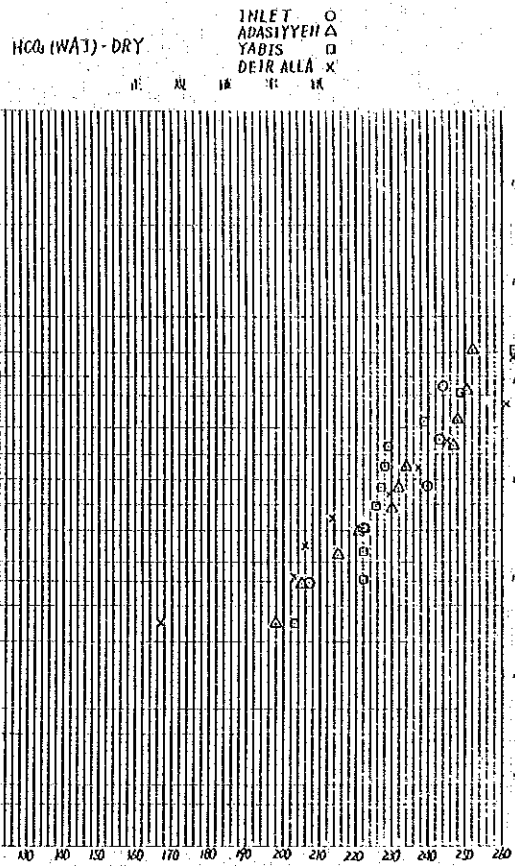


Fig. 44  $\text{HCO}_3^-$ , Normal Probability (Dry) by WAT

Magareh ○  
DIERALLA △

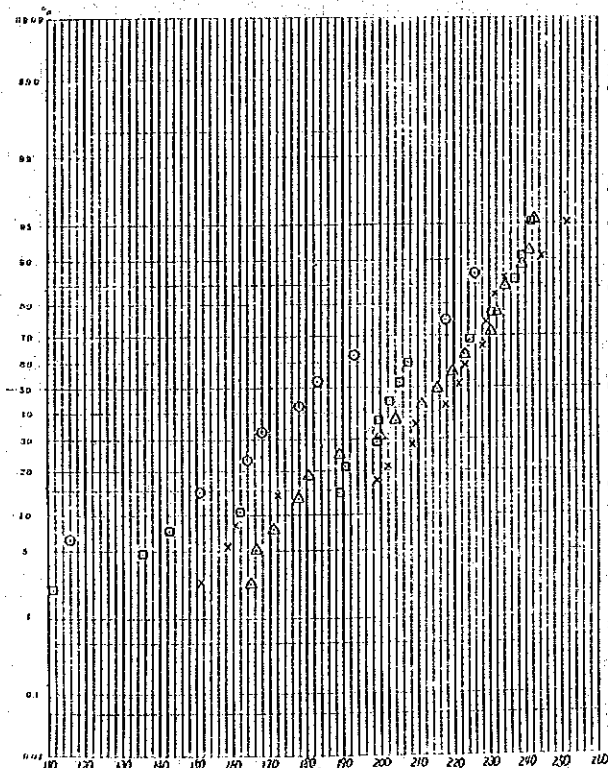


Fig. 45  $\text{HCO}_3^-$ , Normal Probability (Rain) by WAT

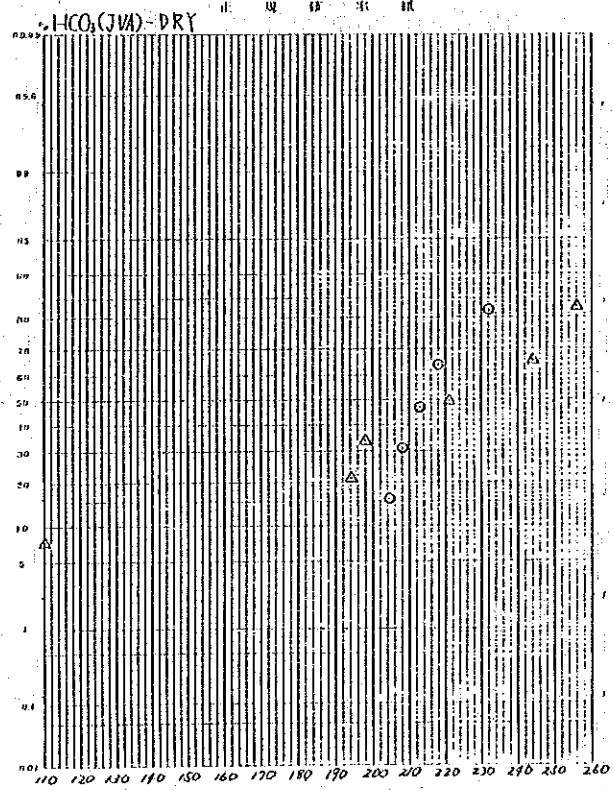


Fig. 46  $\text{HCO}_3^-$ , Normal Probability (Dry) by JVA



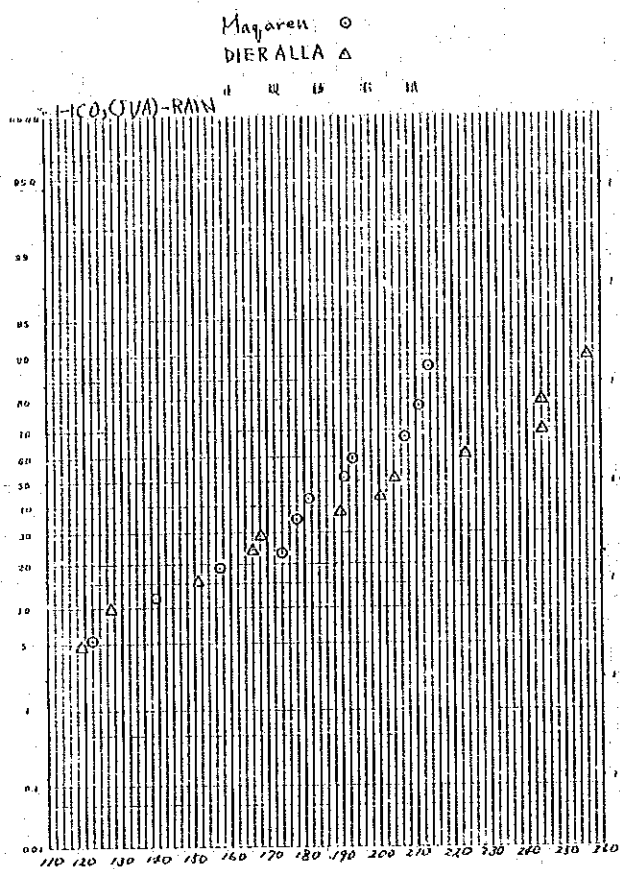


Fig. 47  $\text{HCO}_3^-$ , Normal Probability (Rain) by JVA

$\text{NO}_3^-$  (WAI) DRY

INLET ○  
ADASIYYEH △  
YABIS □  
DEIRALLA ×

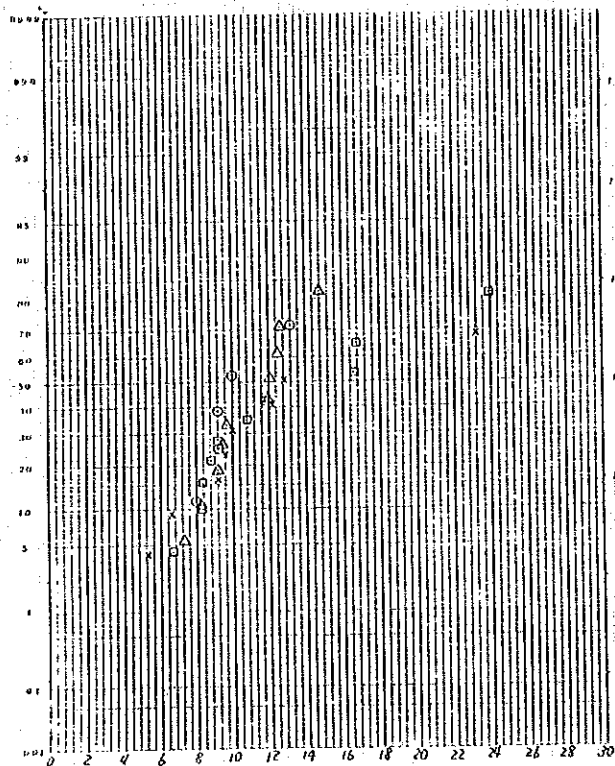


Fig. 49  $\text{NO}_3^-$ , Normal Probability (Dry) by WAI

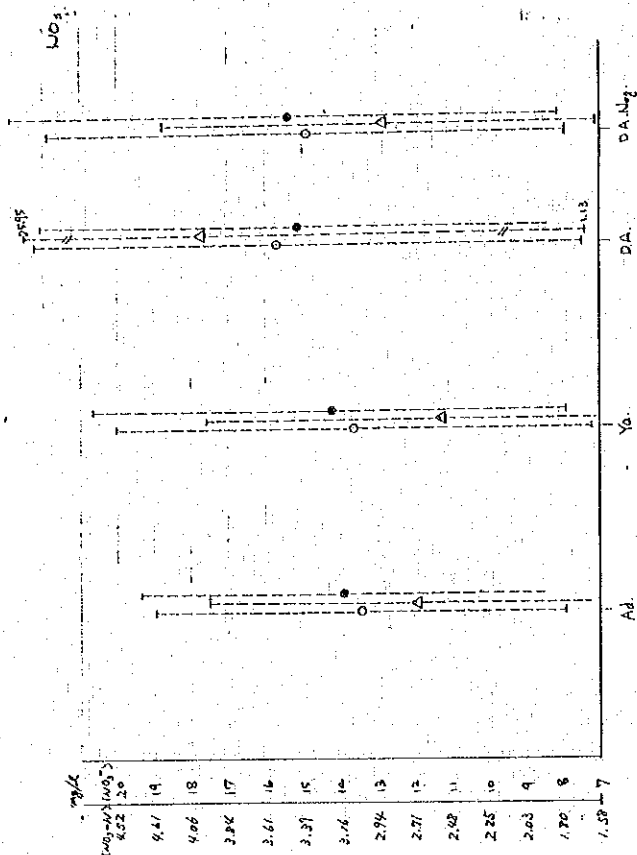


Fig. 48 Nitrate Ion ( $\text{NO}_3^-$ ), M-Value and Range of S.D.

$\text{NO}_3^-$  (WAI) RAIN

INLET ○  
ADASIYYEH △  
YABIS □  
DEIRALLA ×

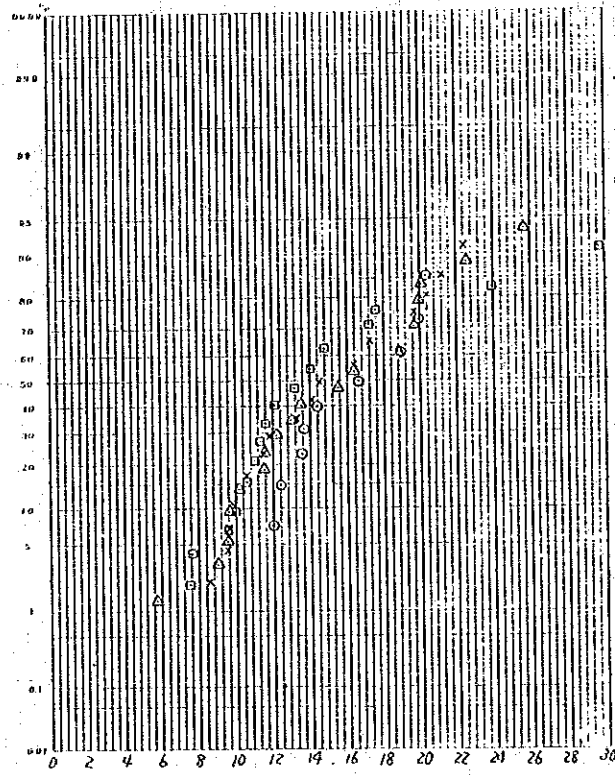
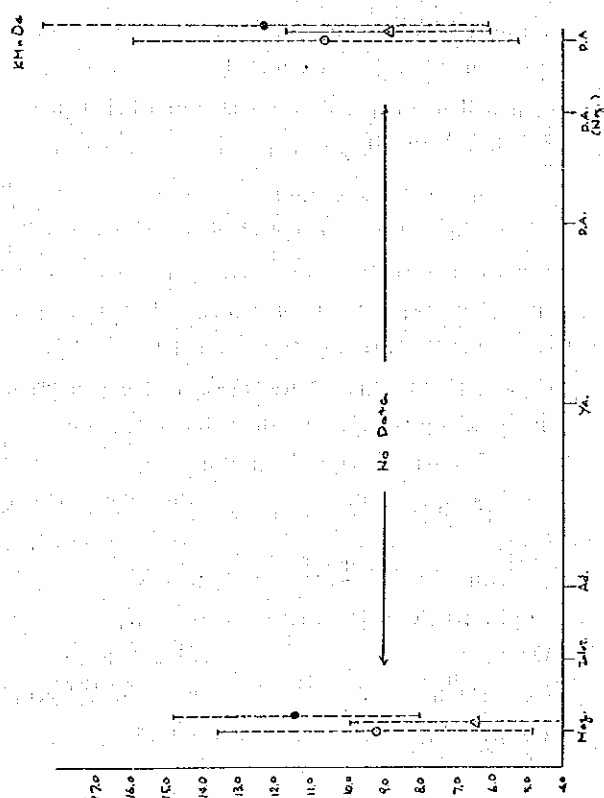
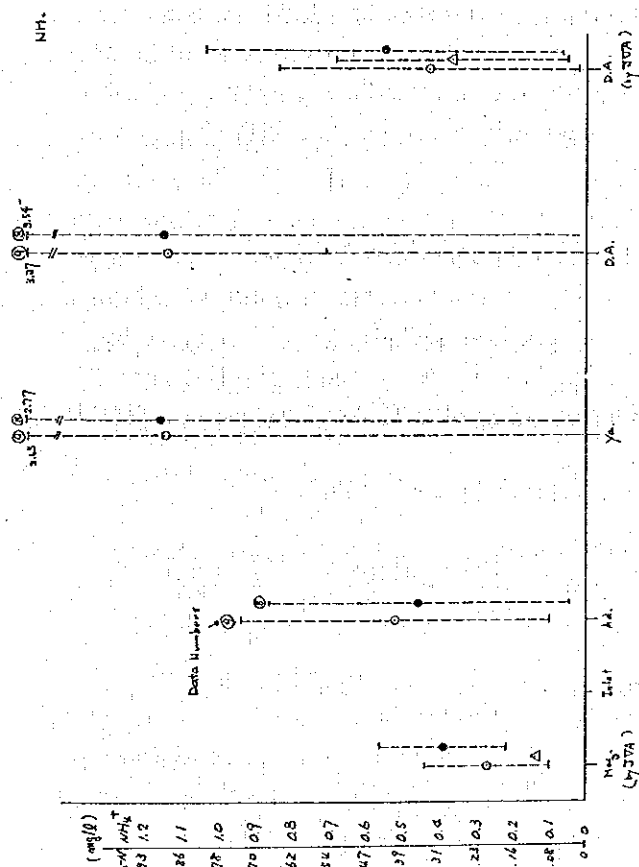
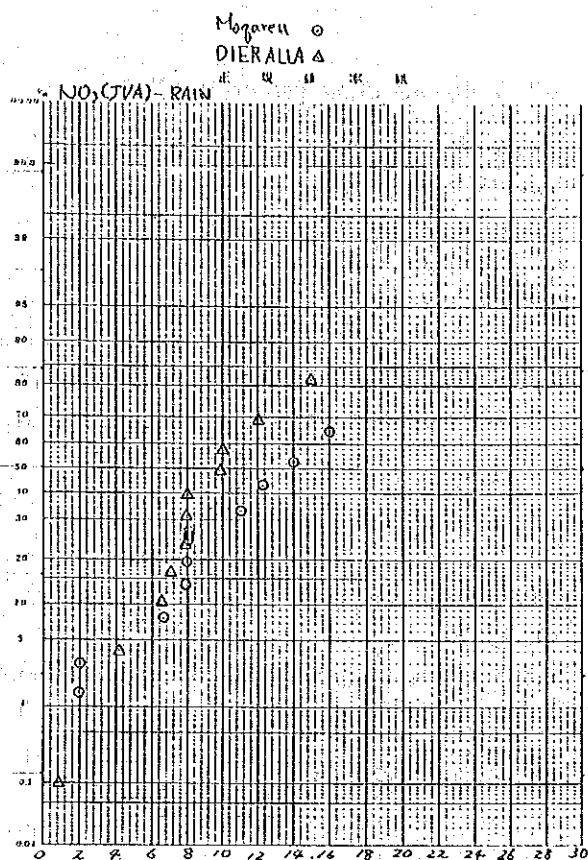
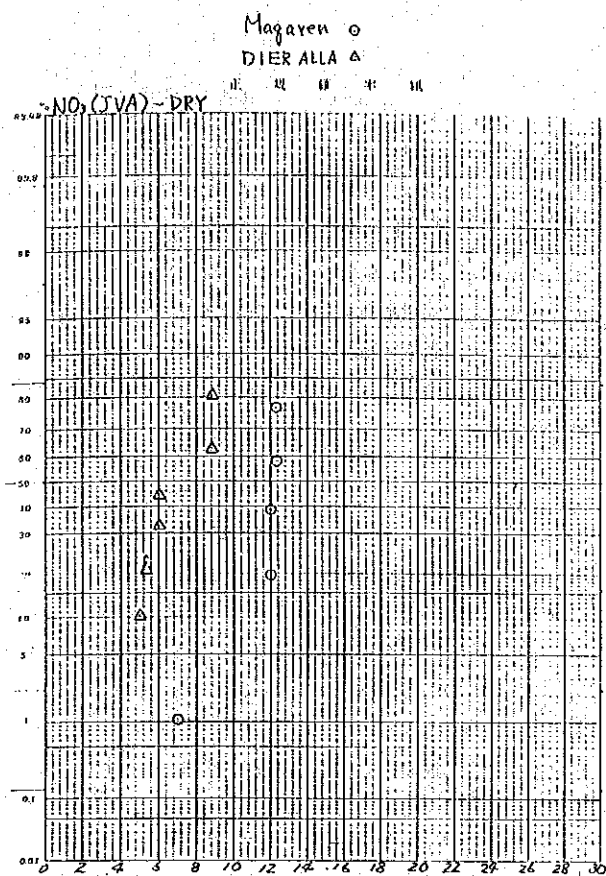


Fig. 50  $\text{NO}_3^-$ , Normal Probability (Rain) by WAI



## 2-2 Trihalomethane Precursor

Water samples were collected at Inlet of the East Ghor Canal and at Addassiyeh on May 28, 1985, for the purpose of estimating amounts of trihalomethane precursor (hereinafter precursor) in connection with water purification at Zay. Also, we filtered part of the samples by a  $0.45\ \mu\text{m}$  pore size membrane filter in the same day in order to measure a total amount and a dissolved amount of precursor. Furthermore, we used part of the samples for testing at the Water Authority Laboratory (WAL) and brought the remainder back to Japan for water quality analysis. In the WAL tests, we conducted a trihalomethane formation potential (THMFP) test of the raw sample water and the jar tested water.

### 1) Test Methods

#### (1) Jar Test

The sample water taken at Deir Alla was divided into five one liter beakers and, while agitating by magnetic stirrer, aluminum sulfate  $[\text{Al}_2(\text{SO}_4)_3 \cdot 16\text{H}_2\text{O}]$  was added at a rate of 10, 20, 30, 40 and 60 mg/l. After a flock was formed, we left it stand for a while and then checked the quality and THM formation potential of the supernatant.

#### (2) THM Formation Potential Test

##### (2-1) Methods in WAL

To the 200 ml samples obtained from the raw water and from post-jar test water (60 mg/l of alum dose), we added sodium hypochlorite solution (concentration at about 2,000 mg/l from Japan) and then left it quietly in a  $20^\circ\text{C}$ . thermostat for 24 hours.

##### (2-2) Methods in Japan

Prelimarily obtained a consumed amount of chlorine in the sample, added the consumed amount of chlorine and 2 mg/l sodium hypochlorite to the sample of temperature set at  $20^\circ\text{C}$ ., then, immediately used sulfuric acid or sodium hydroxide solution to adjust the pH to  $7.0 \pm 0.2$  and left it in a  $20^\circ\text{C}$ . thermostat for 24 hours. After this, measured the THM by solvent extraction method.

#### (3) Measurement of THM

8 ml of the THM formation potential sample was took into a 10 ml plugged centrifugal precipitation tube, and then 1 ml n-pentane was added to extracted THM from it. After being finalized extraction procedure, the plug part of the tube was sealed with teflon tape, then we turned it upside down and carried it back to Japan. That is, the methods of THM analysis is n-pentane extract method. For cross check, we had arranged with WAL to measure THM in the given portion of the same solution.

The gas chromatographic conditions in Japanese Laboratory are as follows:

|                           |  |
|---------------------------|--|
| Gas Chromatograph :       | Shimazu GC-4CME  |
| Column :                  | 10 % DC-550, 60-80 mesh, Chromosorb W, 3 mm x 3 m        |
| Column Oven Temp :        | $100^\circ\text{C}$ .                                    |
| Inlet and Detector Temp : | $150^\circ\text{C}$ .                                    |
| Detector :                | Electron Capture Detector (ECD) $^{63}\text{Ni}$ 10 m Ci |
| Carrier Gas :             | $\text{N}_2$ , 50 ml/minute                              |
| Range :                   | $10 \times 8$  |

(4) Other Parameters

(A) Turbidity

Turbidimetric Method:

Indicated by the amount of kaoline in mg one liter sample.

(B) Color

Platinum-cobalt Method:

Indicated by the amount of platinum in mg within one liter sample.

(C) Total Alkalinity

Indicated by the amount of 0.02N-H<sub>2</sub>SO<sub>4</sub> used to neutralize one liter sample to pH 4.8.

(D) Chloride Ion

Mercuric Nitrate Method:

Adjusted the pH of the sample to 3.1, and titrated it in mercuric nitrate solution using diphenylcarbazol as indicator and then obtained chloride ion.

(E) Sulfate Ion

Barium Chromate Method:

Added barium chromate to the sample to make barium sulfate from sulfate ion, added ammonia solution to it to precipitate excess barium chromate, measured the absorbance by spectrophotometer at 370 nm wavelength of the yellow of the chromate ion formed by permutation from sulfate ion, and then obtained a sulfate ion concentration.

(F) Nitrate Nitrogen

Made the sample react to brucine in the presence of undiluted sulfuric acid, measured the absorbance by spectrophotometer at 415 nm wavelength of the formed yellow, and then obtained a nitrate iron concentration and indicated it as the amount of nitrogen in nitrate ion.

(G) Ammonium Nitrogen

Made ammonium ion in the sample to monochloramine by the co-existence of sodium hypochlorite of alkalinity, measured the absorbance by spectrophotometer at 720 nm wavelength of the bluish green indonaphtol formed in  $\alpha$ -naphatol reaction with it, and then obtained an ammonium iron concentration and indicated it as the amount of nitrogen in ammonium ion.

(H) KMnO<sub>4</sub> Consumption Value

Made the sample to sulfuric acidic, boiled it for five minutes after adding KMnO<sub>4</sub>, and then indicated the amount of KMnO<sub>4</sub> consumed in mg within one liter.

(I) Total Hardness

EDTA Method:

Make calcium ion and magnesium ion react with EDTA, and then obtained calcium ion and magnesium ion from the reacted amount of EDTA, and indicated it in mg as the amount of calcium carbonate in one liter.

(J) Total Residual

After vaporizing and solidifying the sample, dried it at 105°C., and indicated in mg the weight of the residual in one liter.